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Abstract

The purpose of this study was to explore health professional’s opinions concerning the role of exercise in the treatment of eating disorders (EDs) and to introduce recommendations for incorporating exercise into ED treatment. Exercise abuse is a behaviour often displayed by those with EDs. Given the low success rates of current treatment methods, exercise has been postulated as a method to help manage exercise abuse and improve overall prognosis, however, little research exists that examines exercise as a supportive treatment for EDs. To explore the role of exercise in ED treatment, semi-structured interviews were conducted with a panel of international health professionals (n=13) with expertise in ED treatment and management. Expertise was determined through educational training specific to the field, published scholarly research on exercise and EDs, and/or by current clinical work and interest in the role of exercise within ED treatment. Verbatim interview transcripts were analysed using thematic analysis and four main themes emerged, including: 1) Understanding the Current State; highlighted the historical negative views and common practise of abstaining from exercise during treatment, yet also indicated that these views and practises are changing, 2) Gaining Perspectives; outlined the gap in ED research and practice which is compounded by a lack of knowledge surrounding exercise and EDs and a fear of incorporating exercise into ED treatment, 3) Barriers and Benefits; presented attitudinal (e.g., negative views of exercise) and practical (e.g., funding) barriers, yet also identified physical (e.g. increased muscular-skeletal), and psycho-social (e.g., greater self-esteem) benefits, and 4) One size Does Not Fit All; suggested that the exercise prescription must be progressive and tailored to individual needs, include a mix of exercise modalities and be undertaken in a supportive environment not focused on body shape or image. These results provide a foundation for understanding the complex issues and challenges
surrounding the utilisation of exercise as an ED treatment method and provides recommendations for moving this topic area forward.
Preface

This dissertation is original, unpublished, independant work by the author, D. Quesnel.

Ethical approval for this project was obtained from the University of British Columbia Okanagan’s Behavioural Research Ethics Board (H15-01276).
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List of Abbreviations

ACSM: American College of Sports Medicine
AN: Anorexia Nervosa
AN-R: Anorexia Nervosa Restrictive Subtype
AN-P: Anorexia Nervosa Purging Subtype
BED: Binge Eating Disorder
BN: Bulimia Nervosa
BMI: Body Mass Index
CBT: Cognitive Behavioural Therapy
CBT-A: Cognitive Behaviour Therapy for Anorexia
CBT-B: Cognitive Behaviour Therapy for Bulimia
CBT-E: Cognitive Behaviour Therapy Enhanced
CRT: Cognitive Remediation Therapy
CVD: Cardiovascular Disease
DBT: Dialectical Behaviour Therapy
DSM-IV: Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition)
DSM-5: Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition)
ED(s): Eating Disorder(s)
EDNOS: Eating Disorder Not Otherwise Specified
FBT: Family Based Therapy
FBT-AN: Family Based Therapy for Anorexia Nervosa
FBT-BN: Family Based Therapy for Bulimia Nervosa
IPT: Interpersonal Therapy
MANTRA: Maudsley Model for Individual Treatment of Anorexia Nervosa

n: Number of the sample

OSFED: Other Specified Feeding and Eating Disorders

RT: Resistance Training

SD: Standard Deviation
**Glossary**

**Anorexia Nervosa (AN):** AN is characterised by restricted food intake with or without behaviours of purging and the inability to maintain a body weight at or above minimally normal. These factors are coupled with an intense fear of gaining weight or becoming fat. Subtypes of AN include restrictive and binge-eating and/or purging subtype (American Psychiatry Association, 2013).

**Binge Eating Disorder (BED):** Binge Eating Disorder is now recognised in the DSM-5 as an independent eating disorder. It is marked by recurring episodes of eating significantly more in a short period of time than most people would under similar circumstances, with these episodes being marked by a feeling of lack of control. These individuals may eat too quickly or when not hungry, hiding binging behaviours and feeling disgusted, embarrassed and are markedly distressed (American Psychiatric Association, 2013).

**Body Mass Index (BMI):** A statistical measure of weight according to height. The calculation for BMI is kilograms /meters$^2$ (McArdle, Katch, & Katch, 2008).

**Body Image:** One’s perceptions toward his or her body as whole, which is inclusive of the attitude regarding perceived physical and functional characteristic of the body (Santos, 2014).

**Bulimia Nervosa (BN):** Bulimia Nervosa is characterised by frequent episodes of binge eating followed by inappropriate compensation methods, such as self-induced vomiting, or excessive exercising to avoid weight gain (American Psychiatric Associations, 2013).

**Clinician:** A clinician is defined as a person (such as a doctor or nurse) who works directly with patients rather than in a laboratory or as a researcher (Marriam-Webster, 2016).

**Disordered Eating:** This title encompasses eating behaviours that are troublesome, such as restrictive dieting, binging and purging and the combination of these behaviours without
diagnostic significance. These behaviours occur less frequently or are less severe than behaviours required to meet a full eating disorder diagnosis (Canadian Mental Health Association, 2015).

*Eating Disorder Not Otherwise Specified (EDNOS):* Individuals presenting with disorders of eating that do not meet the criteria for a specific eating disorder (Grilo & Mitchell, 2011).

*Exercise:* Planned, structured, repetitive and purposeful physical activity (McArdle, Katch, & Katch, 2008).

*Exercise Prescription:* An exercise prescription is defined as a specific plan of fitness related activities designed by a fitness or rehabilitation specialist (American College of Sport Medicine, 2006).

*Exercise Specialist:* Is operationally defined as a professional who holds a degree in Kinesiology or Human Kinetics with a focus on exercise physiology and/or promoting physical activity and exercise behaviours.

*Health Professional:* For the purpose of this study, this broad range category will encompass clinicians and researchers who hold recognised certification in different aspects of health care. This can include clinical therapists, health researchers, nurse, occupational therapist, medical practitioner and psychiatrist.

*Inpatient Treatment:* Inpatient hospitalization is provided to individuals who are physiologically compromised and require intensive medical stabilization (Geller et al., 2012).

*Lived experience:* In phenomenological research, lived experience is a person’s perspective of a situation that was acquired through his/her first-hand account of a situation (Creswell, 2007).
**Multidisciplinary Team:** Refers to activities that involve the efforts of individuals from a number of disciplines. These efforts are disciplinary-orientated and, although they may impinge upon clients or activities dealt with by other disciplines, they approach them primarily through each discipline relating to its own activities (Norrefalk, 2003).

**One Repetition Maximum:** Maximal amount that can be lifted in one complete repetition with proper technique (Canadian Society of Exercise Physiology, 2006).

**Physical Activity:** Any bodily movement produced by skeletal muscles that result in energy expenditure (Casperson, Powell, & Christenson, 1985).

**Quality of Life:** Quality of life encompasses multi-dimensional aspects of one’s life including; physical and material wellbeing, social wellbeing, emotional wellbeing and development and activity (Felce & Perry, 1995).

**Residential Treatment / Outpatient Treatment:** A mode of service delivery that targets medically stable individuals who are in need of a structured and intensive treatment program, outside of a hospital setting (Geller et al., 2012).

**Self-Efficacy:** Self-Efficacy refers to an individual’s belief in his or her own capacity to execute behaviours necessary to produce specific performance goals. It reflects confidence in ability to exert control over one’s own motivation behaviour and social environment (Bandura, 1977).
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“We are the sum of all people we have ever met; you change the tribe and the tribe changes you”

Dirk Wittenborn.

In the last two years of my life I have encountered countless faces, select faces that grew to be strong relationships that I value wholeheartedly today. Though passing interactions to deep and meaningful conversations it is the influence of these relationships that has formed and shaped me. Without the people in my life who have helped shape the person I am, I would not be standing where I am today.

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proud, your skills and insight have made me a better researcher, student and individual. Thank you.
CHAPTER ONE - INTRODUCTION

1.1 Layout of Thesis

This thesis is organised into six sections. Chapter one provides an overview and an introduction of the overarching purpose of the research. Chapter two reviews the literature most pertinent to the area of research, with a focus on the prevalence, health consequences and current treatment methods of eating disorders (EDs). Specifically, it summaries the literature concerning the influence of exercise in the treatment of EDs. Following the review, chapter three outlines the methodological protocol used to collect data, as well as describes the management and analysis of data. The study results are presented in chapter four and discussed in chapter five. Chapter six provides concluding remarks and future recommendations.

1.2 Overview

EDs are mental health illnesses with a complex pathology affecting both mental and physical health (Vancampfort et al., 2014). These perplexing illnesses take their toll on a patient’s health through distorted thoughts around food and body weight. An increase in the prevalence of these mental illnesses has been observed in the last decade, driven by the ever-increasing value placed on a mostly unachievable body physique in our culture (Neumark-Sztainer, 2013; World Health Organization, 2011). The main diagnoses included under the umbrella term of EDs are Anorexia Nervosa (AN), Bulimia Nervosa (BN), Other Specified Feeding or Eating Disorder (OSFED) (also recognised as Eating Disorder Not Otherwise Specified-EDNOS), and Binge Eating Disorder (BED). In Canada, the lifetime prevalence of AN in women is between 0.5% and 3.7%, and 0.3% in men (Health Canada, 2011; Hoek, 2007). Since the initiation of BN into the DSM-III in 1980, the prevalence of this illness has continued to climb; between 1.1% and 4.2% of women and 0.5% of men are currently affected (Health
Canada, 2011; Hoek, 2007). EDNOS encompasses a broader population of patients and is present in 4.78% of women and 4.64% of men (Hudson, Hiripi, Pope, & Kessler, 2007; Le Grange, Swanson, Crow, & Merikangas, 2012).

These prevalence rates may not seem to be cause for alarm, however, it is worrisome that the incidence of these illnesses have been increasing over the last decade and are now observed in younger and more diverse populations (i.e., ethnic populations, men) (Haines, Neumark-Sztainer, Eisenberg, & Hannan, 2005; Neumark-Sztainer, 2013). Moreover, the incidence of unreported EDs are high, particularly in males, who often struggle with body dysmorphia and strict exercise regimens (Harvey & Robinson, 2003). Not only do many EDs remain undiagnosed, one study has determined that only 13% of EDs are treated in the female population (Merikangas et al., 2011). Some of the central risk factors associated with this illness, including inappropriate dieting, negative body image, self-esteem and weight concerns, are continuing to increase in prevalence among youth and teenagers and affect their health as they transition to adulthood (Haines, et al., 2005; Neumark-Sztainer, 2013). Currently one in five North American women are diagnosed with disordered eating (i.e., unhealthy weight control practices and binge eating) or an eating disorder, a statistic that is expected to increase (Eating Disorder Statistics, 2015; Neumark-Sztainer, 2013).

All EDs result in significant impairment of physical and mental health, and increased risk of pre-mature mortality (Carei, Fyfe-Johnson, Breuner, & Brown, 2010; Moola, Gairdner & Amara, 2013; Steinhausen, 2009). Many, if not most, of the physical and mental health effects of these illnesses are a result of long-term starvation and/or malnutrition (Geller et al., 2012; Grilo & Mitchell, 2011; Zunker, Mitchell, & Wonderlich, 2011). Malnutrition and starvation affect various systems of the body in patients with EDs. For instance, bradycardia and hypotension are
common side effects that occur in the cardiovascular system (Grilo & Mitchell, 2011). Dermatological and gastrointestinal issues arise often and endocrine functioning declines, leading to amenorrhea and effecting short and long-term bone health (Geller et al., 2012; Grilo & Mitchell, 2011). EDs have also been linked to a number of mental health illnesses, including depression, bipolar and anxiety disorders, social phobias, posttraumatic stress disorder, obsessive-compulsive disorder and substance abuse (Blinder, Cumella, & Sanatharat, 2006; Vancampfort et al., 2014).

The treatment methods currently recommended include psychotherapy, such as Cognitive Behavioural Therapy (CBT) and Family-Based Therapy (FBT), often in combination with pharmacological treatment and nutrition counselling (Geller et al., 2012; Grilo & Mitchell, 2011). The full recovery rate of these illnesses based on these treatment protocols is estimated to be no greater than 50%, supporting the need for additional adjunct treatment methods and early detection (Reel, 2013). The methods of treatment required are those that are widely accessible to populations who are at the greatest risk, are low in cost, and are acceptable to both patients and practitioners (Neumark-Sztainer, 2013). A supporting treatment (coinciding with treatment needs outlined above) that has been proposed by health professionals working with EDs is exercise. Currently, exercise is mainly restricted in treatment regimes and the resumption of activity is contingent upon weight, however, researchers and clinical health professionals have begun questioning the influence that prescribed exercise may have on treatment prognosis (Chantler, Szabo, & Green, 2006; Davies et al., 2008; Duesund & Skarderud, 2003; Fernandez-del-Valle et al., 2010; Geller et al., 2012). As a result, health professionals have begun proposing various exercise modalities be incorporated into treatment plans (Chantler et al., 2006; Davies et al., 2008; Duesund & Skarderud, 2003; Fernandez-del-Valle et al., 2010). The evidence emerging
from this research has indicated that exercise, when used as a supportive therapy, can have a significant positive impact on AN, BN, and EDNOS. Specifically, exercise has had positive effects on quality of life, body composition, central health markers of the illnesses (e.g., drive for thinness, weight and shape concerns, and eating restraint) and co-occurring illnesses (e.g., anxiety, depression, muscle degradation, body esteem issues, sleep disturbances, perceived stress, osteoporosis) in those with AN, BN and EDNOS (Hausenblas, Cook, & Chittester, 2008; Ng, Ng & Wong, 2013; Moola et al., 2013; Vancampfort et al., 2014). Although many positive outcomes have been discovered through new research and practice, exercise can imply several health risks in this population. The risks that have been associated with inappropriate levels and intensity of exercise include the hindering of weight gain, enforcing the pathogeneses and progression of AN and BN, exacerbating medical complications (cardiac, electrolyte, sudden death, fractures) and has been related to unfavourably influencing prognosis (Hausenblas et al., 2008; Ng et al., 2013; Zunker et al., 2011).

Despite the benefits associated with including exercise in the treatment of EDs, researchers and clinical health professionals working with patients with EDs agree that little is known about the most effective and safest exercise protocol for patients with EDs, thus making it difficult for health professionals to safely recommend exercise for patients with EDs (Geller et al., 2012; Hausenblas et al., 2008; Hechler, Beumont, Marks, & Touyz, 2005; Thien, Thomas, Markin, & Biringham, 2000; Zunker et al., 2011). Given this research gap, greater knowledge and understanding of the role that exercise may play in the treatment of EDs is needed, particularly concerning the type and dose of exercise appropriate to provide optimal health benefits for patients with EDs (Moola et al., 2013; Vancampfort et al., 2014; Zunker et al., 2011). To address this need, an exploration of the perceptions and beliefs of health professionals
with expertise in ED treatments and knowledge concerning exercise as a supportive treatment to EDs, is warranted.

1.3 The Purpose and Objective

The over-arching purpose of this study was to explore the perceptions, opinions and beliefs of ED health professionals concerning exercise as a supportive treatment for EDs. The specific objectives of this research included:

1) Identifying a diverse panel of ED health professionals with knowledge and expertise in the use of exercise as a supportive treatment for EDs.

2) Utilising qualitative methods to explore the perceptions and beliefs of these health professional experts concerning the role of exercise in the treatment of EDs and introduce recommendations for incorporating exercise into the treatment of EDs.

3) To introduce expert driven recommendations for the appropriate use of exercise as a supportive treatment for EDs.

1.4 The Current Study

This study’s aim was to explore the perceptions, opinions and beliefs of ED health professionals concerning exercise as a supportive treatment for EDs. Based on these findings, initial recommendations concerning approaches for including exercise in the treatment protocol for patients with EDs were presented. This was achieved by identifying a panel of experts in the field of EDs who had knowledge concerning the use of exercise in the treatment of EDs, and then conducting semi-structured interviews with these experts to gain detailed information regarding the role of exercise in ED treatment. Results were then organised under specific themes based on the objectives of this study and the research literature.
1.5 Significance and Contribution to the Research Literature

Inconsistencies remain between the research literature and the incorporation of exercise into ED treatment. No single protocol has been systematically incorporated into research or treatment. As a result, there is limited knowledge concerning the safest protocol and most effective exercise practices for this population (Moola et al., 2013). This research addressed this knowledge gap and provided a greater understanding about the role of exercise in the treatment of EDs. In addition, this research was the first to introduce recommendations for incorporating exercise into the treatment of ED.
2.1 Overview

Despite the evidence supporting exercise as a preventive treatment of modifiable diseases and illnesses, it still remains underutilised by physicians and health care professionals. In the field of disordered eating or eating disorders (EDs), this trend is particularly evident. With the mounting evidence to support exercise as a supportive treatment for EDs, a shift in focus is needed where health professionals start capitalizing on the full potential of exercise within clinical ED settings to improve health and treatment outcomes. The following provides a comprehensive review of literature outlining the types and prevalence of EDs, reviewing the current treatment methods, and highlighting the role and impact of exercise in the treatment of EDs.

2.2 An Overview of Eating Disorders

EDs are psychological illnesses in which eating disturbances are central. The spectrum of EDs encompasses illnesses that involve insufficient nutritional consumption and excessive food intake. Individuals may present with disordered eating patterns such as extreme weight control practices and binging, without necessarily meeting the criterion for an ED, however, these behaviours directly increase the risk of developing an ED (Neumark-Stainzer, 2013; Streigel-Moore & Bulik, 2007). Under the umbrella term of EDs there is a spectrum of EDs that include: Anorexia Nervosa (AN), Bulimia Nervosa (BN), Eating Disorder Not Otherwise Specified (EDNOS) and Binge Eating Disorder (BED) (American Psychiatric Association, 2013). Given the increased prevalence and incidence of AN, BN and EDNOS, the literature review and project focused on these specific EDs. BED was not reviewed in its relationship to exercise as the physical and mental health characteristics of patients with BED relate differently to exercise then
patients with AN, BN or EDNOS. The recent changes to the DSM, withdrew BED from the category of EDNOS and formed two distinct categories; Other Specified Feeling or Eating Disorder (OSFED) and BED. As a result of the remaining similarities between OSFED and EDNOS and the novelty of the new EDs, there is a very limited amount of literature pertaining to OSFED. Thus EDNOS, not OSFED, was included in this review of literature. More specific diagnosis features of each ED can be found in Appendix A.

In the DSM-IV, AN was characterised by a refusal to maintain body weight at or above a minimal normal weight (i.e., less than 85% of ideal body weight), a fear of gaining weight or becoming fat, an over concern with body shape and weight, and a distorted body image (American Psychiatric Association, 1994, 2013; Grilo & Mitchell, 2011). There are two subtypes of AN, restrictive subtype (AN-R) and binge/purging subtype (AN-P) (American Psychiatric Association, 1994; Grilo & Mitchell, 2011). Patients with AN-R achieve weight loss through excessive dieting, food restriction and extreme exercise (Duesund & Skarderud, 2003). Patients with AN-P also demonstrate these characteristics but do so in combination with episodes of binging and binging/purging (Duesund & Skarderud, 2003). The DSM-5 has changed the diagnostic criteria for AN by; 1) eliminating the word “refusal” in terms of body weight maintenance, 2) removing the criterion of amenorrhea, which is the absence of at least three menstrual cycles, and 3) taking out the criteria that an individual must be below 85% of their expected body weight (American Psychiatric Association, 2013). Data has shown that AN ranges in prevalence between 0.3% and 3.7% of females, and has a lifetime presence in 0.9% of Canadian women and 0.3% in Canadian men (Hoek, 2007).

AN is the mental illness with the highest death rate of all mental health diagnoses (Agras, 2001). It is estimated that 5.6% to 10% of individuals with this disorder will die within ten years.
of its onset (Sullivan, 2002). The risk of suicide is 57 times higher in those with AN than in controls individuals and women with AN are 12 times more likely to die than women of similar age in good health (Jaret, 2010). Less than half of patients with AN fully recover from the disease, 33% make improvements to their initial symptoms but are often plagued by the re-occurrence of symptoms, and 20% of patients show no improvement in the symptomology that induced their illness to begin with (Ben-Tovin et al., 2001; Reel, 2013). In adolescence, the recovery prognosis is more favourable and it is estimated that about 76% of patients in this age group will fully recover (Reel, 2013).

BN’s diagnostic features were introduced in the DSM-III in 1980 after AN (American Psychiatric Association, 1994). Based on the criteria described by the DSM-5, this illness is characterised by episodes of consuming large amounts of food in a brief period of time, followed by feelings of lack of control and the use of inappropriate compensatory purging methods such as vomiting, exercise, laxatives or prolonged fasting (American Psychiatric Association, 2013). Changes made in the DSM-5 call for these behaviours to be present at least once a week (previously the criterion was three times a week), for three months (American Psychiatric Association, 2013).

BN is prevalent in 1.5% of women and 0.5% of men in Canada (Hoek, 2007). The mortality rate of BN is 3.9%; this illness is estimated to have a life time duration of 8.3 years (Hudson Hiripi, Pope, & Kessler, 2007). Recovery rates range from 35% to 75% of patients who have been clinically diagnosed (Ben-Tovin et al., 2001; Geller et al., 2012). It is widely accepted that about 50% of patients will fully recover but many will continue to have symptoms of the disease (e.g., binge/ purging episodes, anxiety around meal times etc.) and an estimated 30% of patients will relapse (Geller et al., 2012; Steinhausen, 2009). Follow-up studies suggest that after
ten years, only 10% of patients with BN will continued to experience the full disorder (Agras, 2001; Keel et al., 1999; Schmidt, 2008).

The diagnosis of EDNOS encompassed BED and all disordered eating that did not meet the diagnostic criteria for any specific ED (American Psychiatric Association, 1994). For example, if all criteria were met for an AN diagnosis, with the exclusion of significant weight loss, that individual would qualify for an EDNOS diagnosis (American Psychiatric Association, 1994). Patients that present with extreme atypical eating behaviours, also qualify for an EDNOS diagnosis (American Psychiatric Association, 1994).

The prevalence of EDNOS is between approximately 2% and 3.06% of females in Canada and 0.15% of males (Geller et al., 2012; Hoek, 2007). In a review by Keel (2010), the duration of this illness was reported to be about five years and follow-up studies conclude that between 67%-69% of patients will make a full recovery from EDNOS (Keel & Brown, 2010). Keel (2010) also noted that at the 20-year follow-up point, the rate of remission was 75% for EDNOS patients, leaving approximately 25% of this population with chronic EDNOS (Keel & Brown, 2010). This same review also reported a rate of mortality of 0%, however, a second report observed a mortality rate of 5.6% (Ben-Tovin et al., 2011; Crow et al., 2009; Keel & Brown, 2010).

2.3 Risk Factors Associated with Eating Disorders

A risk factor is defined as a characteristic, event or experience that precedes the onset and increases the likelihood of an outcome of interest (Striegel-Moore & Bulik, 2007). Risk factors associated with EDs are often categorised as: psycho-social/cultural, environmental, and biological and genetic (Bulik et al., 2006; Geller et al., 2012; Grilo & Mitchell, 2011).
2.3.1 Psycho-Social and cultural factors. Western media and advertisements endorse the prevailing cultural attitudes around body physique for women that are focused on thinness and low weight (Grilo & Mitchell, 2011; Striegel-Moore & Bulik, 2007). The media driven desire to achieve a virtually unobtainable body shape often leads to body dissatisfaction and consequential dietary restraint and restriction, all of which are strong predictors of disordered eating and an ED (Striegel-Moore & Bulik, 2007). In addition, concern with body shape, weight and self-worth, has also been associated with an increased risk of low self-esteem and self-efficacy in those with EDs (Beato-Fernandez, Rodriguez-Cano, Belmonte-Llario, & Matinez-Delago, 2004; Ghaderi & Scott, 2001; Jacobi et al., 2004). Negative body image and body dissatisfaction, resulting from weight concerns (e.g. fear of weight gain), has not only been shown to increase the risk of developing an ED, but are also predictive of disturbed dieting behaviours. This is of concern as experts have identified these behaviours as a potential cause of EDs, particularly for those with BN (Hilbert et al., 2014; Jacobi et al., 2004; Striegel-Moore & Bulik, 2007). In one study, it was determined that 88% of patients with BN started their bulimic behaviours during a period of dieting (Pyle, Mitchell, & Eckert, 1981). Together, the effects that low self-esteem and negative body image have in relation to weight concerns, can result in behaviours that are predictive of a subsequent ED.

Ethnicity is a socio-cultural risk factor associated with EDs and the prevalence of EDs significantly differs across various ethnic groups (Grilo & Mitchell, 2011). Caucasians from North America, Europe and Australia have higher rates of EDs than other ethnic groups while Hispanic populations display equal rates of disturbed eating as the Caucasian population despite slightly different body ideals (Crago, Shisslak, & Estes, 1996; Jacobi et al., 2004; Striegel-Moore & Bulik, 2007). African Americans have a decreased risk of developing AN or BN, but it has
been noted that this population is at an increased risk for BED (Jacobi et al., 2004). As a result of these new trends, EDs are now being seen in more ethnically diverse populations than ever before (Geller et al., 2012; Grilo & Mitchell, 2011; Neumark-Sztainer, 2013).

2.3.2 Environmental factors. Dysfunctional familial environments have been identified as playing a role in the development of EDs, specifically in households that are more disjointed and uncommunicative (Friedmann, Wilfey, Welch, & Kunca, 1997). Family characteristics associated with increased risk for an ED include: over protective and controlling parents, unsupportive or invalidating interaction styles and overall negative family function (Grilo & Mitchell, 2011; Jacobi et al., 2004). Historically, AN has been described as the disease of affluence (Striegel-Moore & Bulik, 2007). However, researchers have also linked it to households with a low socioeconomic status, where dysfunctional and chaotic family dynamics are often present. A more recent review has indicated that ED diagnosis is becoming more common across all socioeconomic status (Mitchison & Hay, 2014).

Adverse life events have also been associated with the onset of a future ED (Bulik 2007; Jacobi et al., 2004; Striegel-Moore & Bulik, 2007). Adverse life events can include a number of experiences (e.g. bulling, family deaths, physical or sexual abuse), however, adult sexual assault and childhood sexual abuse have been specifically related to the onset of an ED (Jacobi et al., 2004). A second aspect associated with the onset of AN are childhood feeding problems such as extremely picky eating and pica (eating inedible substances) (Hilbert et al., 2014). In BN statistics, childhood obesity and weight related teasing presents increased risk for this eating disorder (Hilbert et al., 2014).

Outside of the household, an individual’s sport of choice influences the risk of an ED (Jacobi et al., 2004; Hilbert et al., 2014). Participation in sports that focus on body shape and
emphasise low body weight contributes to the onset of an ED (Jacobi et al., 2004). Studies have confirmed that individuals who participate in sports such as ballet dance, gymnastics, wrestling, horse racing (i.e., jockeys), running and swimming are all at increased risk of an ED (Jacobi et al., 2004; Sudi et al., 2004; Sundgot-Borgen & Torstveit, 2004).

2.3.3 Biological and genetic factors. Possibly one of the most evident biological risk factors associated with EDs is gender. Studies at both clinical and population levels, have reported a ratio of 10:1 in which females are more likely to be diagnosed with AN and BN compared to males (Beato-Fernandez et al., 2004; Crow, 2014; Jacobi et al., 2004; Striegel-Moore & Bulik, 2007). However, it should be understood that the presence of these illnesses, particularly AN, is increasing in males (Striegel-Moore & Bulik, 2007).

Age is a factor that further increases the risk of an ED, with the onset age dependant upon the specific ED. Generally, the median age range of onset is between 18-21 years, notably post onset of puberty (Ghaderi & Scott, 2001; Hudson et al., 2007; Striegel-Moore & Bulik, 2007). In an epidemiological study of over 5000 participants the mean age of onset for AN was 18.9 years (SD=±.8) and 19.7 years (SD= ±1.3) for BN (Hudson et al., 2007). It should also be noted that in recent studies the onset age for EDs has been younger than previously documented, including children as young as six years old (Neumark-Sztainer, 2013).

Family studies support the idea that having a family member with a history of an ED increases the risk of an ED for a related individual based on genetic and environmental factors (Jacobi et al., 2004). Genetically, the relative risk of full diagnosis of AN or BN is 11.3 and 12.3 times higher in patients with family members who have had previous ED issues (Jacobi et al., 2004). Studies have shown that a parent with an ED may display some remaining behavioural
symptoms, influencing their child’s eating patterns without their knowledge (Bulik, Reba, Siegar-Riz, & Reichborn-Kjennerud, 2005).

Factors that further contribute to the risk of BN and AN are abnormalities within the serotonin system. Kaye and colleges (2005) showed that during the time of illness as well as post recovery abnormalities were noticed in the serotonergic system. This suggests that these abnormal traits may be independant of the illness, thus imposing increased risk for EDs (Kaye, Bailer, Frank, Wager, & Henry, 2005). Specifically, research has demonstrated a deregulation of serotonin pathways in the cortical and limbic structures of the brain related to traits of anxiety, behavioural inhibition, body image distortion, mood, impulse control as well as motivating and hedonic components of patient nutrition (Kaye et al., 2005). Given that the serotonin system affects both mood and appetite, research has inquired into genetic traits associated with the serotonin system as well its counterpart the dopamine system. When these genes were assessed together, there was an association demonstrated between the presence of AN and the influence of serotonin and dopamine on characteristics central to the disorder (e.g., brain-derived neurotropic factors, catechol-O-methyltransferase, oestrogen receptors) (Striegel-Moore & Bulik, 2007).

Obsessive-compulsive disorders have been highlighted as factors in the subsequent development of EDs, particularly so for patients with AN (Grilo & Mitchell, 2011; Jacobi et al., 2004). The presence of a current psychiatric illness (outside of an ED) increased the risk of ED onset. Based on a study by Patton et al. (1990), the onset of an ED was seven times more likely if a psychiatric disorder was currently present. General psychiatric illnesses present in family members are predictive of EDs in subsequent family members. Particularly, the ancestral presence of mood and/or anxiety disorder has been associated with increased risk for BN (Grilo & Mitchell, 2011). Recent advancement in genetic technologies and studies comparing the
presence of EDs in twins have helped researchers determine a genetic predisposition for EDs. Despite these advancements, the current data on genetic predisposition has a large range. The genetic contribution for the onset of AN ranges between a contribution of 58% - 88%, BN has a consistently large range of 28% - 83% (Bulik et al., 2005; Jacobi et al., 2004). For instance, research comparing the prevalence in twins used structured interviews and self-reported questionnaires to assess AN in 672 (336 pairs of twins) 17 year-old females (Klump, Miller, Keel, & Iacono, 2001). This study identified that AN was 74% related to non-environmental factors within the sets of twins (Klump et al., 2001). To assess the genetic contribution for the risk of BN, a similar method was undertaken by Kendler et al. (1991), in which a sample of 2,163 female twins were assessed via structured interviews and found that genetic factors influenced BN 58% of the time (Kendler et al., 1991). The combination and interplay of all of these factors complicates any attempts to isolate the causation of EDs or the subsequent treatment for EDs. Furthermore, these factors as a whole lead to underlying challenges and consequences impacting the physical and mental health of those with, or at risk of, an ED.

2.4 Physical and Mental Health Consequences

The effects of an ED on the anatomy and physiology of the body are often acute and remedied with proper nutrition, however there are detriments to a patient’s health that may remain, depending on the length of malnutrition. With that, patients with chronic EDs have graver effects on their long-term physical and mental health. The aspects of physical and mental health, reviewed below, where chosen due to their importance in the illness and/or their health implication when influenced by exercise. The following section describes both physical and mental health consequences of each ED, including: malnutrition, poor cardiovascular health,
gastrointestinal problems, impoverished bone health, dermatological problems, issues with endocrine function, and a number of mental illnesses specific to each ED.

2.4.1 Malnutrition. The most common and acute vitamin and mineral deficiencies in patients with ED potassium, magnesium and phosphate (Birmingham, 2012). These deficiencies have a variety of health implications including: muscle weakness, arrhythmia, decline in memory function, difficulty maintaining focus, seizures and, heart and other organ failure (Birmingham, 2012). Patients suffering with chronic EDs, often have a deficiency in vitamin B12. In addition, though less frequently, deficiencies in selenium, vitamin A and niacin have also been reported, all resulting in further systemic health deterioration (Birmingham, 2012). With chronic malnutrition, bone fractures, constipation, bowel pain and repeated infections (pneumonia, kidney infection and bone infection) are more likely (Birmingham, 2012). Typical symptoms of chronic malnutrition are a slowed heart rate, low blood pressure and intermittent oedema, muscle weakness, acrocyanosis and a decline in vision (Birmingham, 2012).

2.4.2 Cardiovascular. The most predominant and acute cardiac effects that result from AN are bradycardia and hypotension (Casiero & Frishman, 2006; Steinberg, 2014). Initially, it was hypothesised that the central cause of death for AN was myocardial infraction induced by elevated cholesterol levels and atherosclerosis, however, autopsies have revealed that this is inaccurate (Isner, Roberts, Heymsfield, & Yager, 1985). Rather, malnutrition causes deregulation of QT interval of the electric cardiac cycle, resulting in abnormal prolongation and QT dispersion. This, however, has been found to be resolved when proper nutrition is restored (Grilo & Mitchell, 2011). Furthermore, with extreme weight loss, there is shrinkage of musculature cells throughout the body. In the heart, cardiac cells become thinner and shrink in overall size, resulting in decreased volume of the cardiac chambers (Casiero & Frishman, 2006). Reduced
exercise capacity occurs as a result of lower cardiac output, attenuating blood pressure responses and subjective fatigue (Casiero & Frishman, 2006). In patients with BN, cardiac complications are evident, but less common than the complications suffered by those with AN (Casiero & Frishman, 2006; Grilo & Mitchell, 2011; Lasater & Mehler, 2001). Purging behaviours, associated with BN causes dehydration, hypokalemia, metabolic alkalosis, hypochloremia, hypomagnesaemia and heart palpitations (Lasater & Mehler, 2001).

2.4.3 Oral and gastrointestinal. Damage to the gastrointestinal system is also common amongst those with an ED. Severe bloating, following eating, and gastroparesis (slowing of gastric emptying) are symptoms associated with AN (Kamel et al., 1991). Constipation occurs variably in patients with AN, however, it is more commonly seen in patients with BN (Pomeroy, Mitchell, Roerig & Crow, 2002). Patients with BN also experience mouth and throat issues such as a torn oesophagus, a consequence of vomiting behaviours. The mucous membrane of the pharynx is often distressed due to the consumption of large amounts of food and forced regurgitation (Steinberg, 2014). The frequency of various vomiting behaviours also causes the soft palate to suffer (Steinberg, 2014). In addition, purging via exercise (i.e., excessive exercise) can result in damage to bones and joints, bruising/abrasion over the spine, increased incidence of infection, persistent muscle soreness and frequent, persistent injury (Geller et al., 2012; McCardle, Katch, & Katch, 2010).

Both purging by way of vomiting and malnutrition further impact the gastrointestinal system due to consequences in oral health. Dentition, the arrangement, morpho-physiology, number and type of teeth in the mouth, is the aspect of oral health most significantly impacted by EDs (Steinberg, 2014). Perimyololysis is morphology of the tooth shape and is the precursor to Dentition. Perimyololysis is due to an erosion of the tooth enamel as a result of the chemical and
mechanical implication of self-induced vomiting (Steinberg, 2014). Parotid, sublingual and submandibular glands are commonly (10-50% of patients) swollen and sensitive, particularly in patients with BN, causing the face to appear enlarged (Lo Russo et al., 2008; Steinberg, 2014). This is a result of malnutrition, purging behaviours and autonomic dysfunction (Grilo & Mitchell, 2011). Many of the effects on patient’s gastrointestinal health are often acute and can be resolved with proper nutrition and decline of purging behaviours. However, the consequences of various purging behaviours on oral and overall health may have chronic, lasting effects.

2.4.4 Bone health. EDs regularly present themselves in an age group where adequate nutrition for building bone density is key to future bone health. Bone loss at a rapid rate occurs in women with osteoporosis. Osteoporosis occurs in approximately 40% of patients with AN, and osteopenia is present in 92% of these women (Grinspoon et al., 2000; Mehler & Andersen, 2010). Moreover, these deficiencies persist in 85% of patients partially recovered from AN. Studies suggest that if the ED is persistent for longer than 12 months, it is predictive of significant loss of bone mineralization, however, serious levels of demineralization have also been reported in brief durations of the illness (Geller et al., 2012; Wong, Lewindon, Mortimer, & Shepherd, 2001). Bone related illnesses are a physical side effect of EDs that have the potential to seriously effect overall health later in life by increasing risk of bone fracture and other bone related illness. To avoid future repercussion, close assessment, monitoring and treatment of these issues is important.

2.4.5 Dermatological effects. There are a variety of dermatological issues that arise from EDs. Hair grows thin and breaks and development of lanugo hair (downy fine hair) is observed on various parts of the body (Gupta, Gupta & Haberman, 1987; Strumia, 2012). The skin becomes dry and nails crack (Geller et al., 2012; Gupta et al., 1987). Skin tone is affected as a
result of over or under ingestion of various minerals, temperature deregulations and purging behaviours (Geller et al., 2012; Grilo & Mitchell, 2011; Gupta et al., 1987; Sturmia, 2012). Specifically, dietary changes are noted to lead to xerosis (dry skin), telogen effluvium (when stress forces the root of the hair into a prematurely resting state), carotenodermo (a discoloration of the skin due to excessive consumption of carotene), acne and hyperpigmentation (Strumia, 2012). Other skin defects, such as a Russel sign (i.e., scarred knuckles from self-induced vomiting), which results from purging behaviours, are also common (Strumia, 2012).

**2.4.6 Endocrine function.** All major endocrine function is significantly deregulated with AN and are of modest severity and prevalence in patients with BN (Mitchell & Grilo, 2011). For instance, menstrual dysfunction is common in those with EDs, and specific to AN, 50%-75% of patients will experience amenorrhea during the course of weight loss and dieting (Katz & Volenhoven, 2000). Although present, these abnormalities are less prevalent and less severe in patients with BN (Gendall et al., 2000). Thyroid function is also altered in patients with AN, and resembles abnormalities such as lower serum levels of thyroid hormones (Mehler & Andersen, 2010). Studies have shown that when approximately 90% of normal body weight is restored, menses and many of the normal disruptions are restored (Gendall et al., 2000).

**2.4.7 Mental illness.** Beyond the physical health consequences of EDs, secondary mental health issues often occur alongside a main ED diagnosis. Research has estimated that between 50% and 80% of the individuals with an ED will have a secondary mental illness at some point in their lives (Bulik et al., 2005). This is further supported by an epidemiological study done by Hudson et al. (2007), revealing that 56.2% of AN patients, 94.5% of BN patients, and 63.6% of sub-threshold diagnosis patients met the criteria for at least one additional DSM-IV mental health diagnosis (Hudson et al., 2007). The psychopathologies often displayed in those with EDs,
include social phobia, anxiety, depression, obsessive-compulsive disorder, substance abuse, bipolar disorder, panic disorder, post-traumatic stress disorder and personality disorders (Grilo & Mitchell, 2011; Vancampfort et al., 2014).

Individuals with AN, often have comorbid mood and anxiety disorders (Grilo & Mitchell, 2011; Vancampfort et al., 2014). Roughly 60% of patients with AN will experience an anxiety disorder and have a higher prevalence of anxiety disorders than aged matched controls (Carei Fyfe-Johnson, Breuner, & Brown, 2010, 2010; Grilo & Mitchell, 2011). In addition, obsessive-compulsive disorder is more commonly related to AN than any other ED (Grilo & Mitchell, 2011). Mood disorders, particularly depression, are not only highly prevalent in those with AN, but it has also been reported that patients with AN are fifty times more likely to commit suicide than age matched controls (Jaret, 2010). Social phobias have also been linked with AN, however, this is a complex diagnosis for this population. Patients typically describe their social fears as stemming from fear of judgment of their eating behaviours, as such, the social phobia may be related to the AN psychopathology rather than a strict fear of social settings (Grilo & Mitchell, 2011).

A striking commonality occurs in the BN patient population, with the presence of many of the same co-occurring psychopathologies. Anxiety disorders are prevalent in 56.9% of patients, and BN was once postulated to be a variant of depression (Grilo & Mitchell, 2011). It is suggested that depression occurs in 50-70% of the patient population (Hudson et al., 2007). Given the common personality trait of “thrill seeking” in this population the high prevalence of substance abuse, and dependence, is not surprising. Along the same lines, personality disorders, specifically Cluster B personality types, have been found to be highly correlated with patients with BN (Grilo & Mitchell, 2011)
Patients with EDNOS have been found to have very similar co-occurring mental illness diagnoses as patients with BN and AN (Milo, 2009). Given the newly separate BED category, more research is needed to discern which co-occurring psychiatric illnesses are present in patients with EDNOS alone, rather than the combined group of patients with EDNOS and BED.

The systemic toll that starvation and malnutrition have on various aspects of health present a complex issue in the treatment of EDs. Despite the reality that many of the physical and psychological issues remediate with proper nutrition, some symptoms can have severe lasting effects on quality of life for patients. To help manage and prevent further physical and mental health consequences of EDs, clinicians need to employ a number of treatment methods including psychotherapy, pharmacotherapy and nutritional counselling.

2.5 Current Treatment Methods of EDs

The primary concern for those with EDs is to address urgent medical symptoms (e.g., cardiac arrhythmias, blood pressure and vitamin and mineral abnormalities). Assessing the medical symptoms also helps to determine the level of care the patient will require (e.g., inpatient, outpatient and intensity level). Once urgent symptoms are under control, there are three main aspects to treatment: psychotherapy, pharmacotherapy, and nutritional counselling (Geller et al., 2012; Grilo & Mitchell, 2011) to help manage and prevent further health complications.

2.5.1 Psychotherapy. According to the British Columbia Treatment Guidelines, psychotherapy is the first line of treatment for all EDs (Geller et al., 2012). The most frequently used psychotherapeutic approach is Cognitive Behavioural Therapy (CBT) (Geller et al., 2012; Grilo & Mitchell, 2011). Other approaches, which stem from CBT are illness specific and include: CBT-Anorexia (CBT-A) and CBT-Bulimia (CBT-B). Others facets of CBT, such as CBT-Enhanced (CBT-E) are dependant upon the individual patient circumstances (i.e., difficult
to treat, chronic ED). Cognitive Remediation Therapy (CRT), Family Based Therapy (FBT), Dialectical Behavioural Therapy (DBT), Interpersonal Therapy (IPT), Maudsley Model for Individual Treatment of AN (MANTRA) and self-help methods will all be further explained within this section (Fairburn, 2008; Grilo & Mitchell, 2011).

The data to support CBT in AN (CBT-A) is limited, however, it is conclusive that this is an effective method of treatment for this illness (Fairburn, 2008; Grilo & Mitchell, 2011). CBT-A addresses the cognitive and behavioural disturbances linked to the core features of the illness and aims to challenge and change these. It has been shown to be successful at reducing relapse and improving recovery rates following weight restoration in patients with AN (Geller et al., 2012). In a study by Serfaty et al. (1999) adult patients were randomised to either CBT-A or nutritional counselling for a six month period. The result of this study showed that CBT-A improved weight in 87% of patients and with that, participants reported significant reduction on self-reported measure of depression and maladaptive ED thinking (Serfaty et al., 1999). In weight-restored patients, studies have shown broad range of outcome, although much of the data are limited by small sample sizes, high rates of attrition, short durations of treatment and other methodological problems (Grilo & Mitchell, 2011).

In BN, CBT addresses the cognitive processes maintaining the bulimic behaviours (Wilson, Grilo, & Vitousek, 2007). The objective of this therapy method is to teach patients to challenge their overvaluation of body shape and weight, their sensitivity to external events and to increase positive mood frequency (Wilson et al., 2007). The general conclusion of systematic reviews is that CBT-B is helpful for the population with BN (Geller et al., 2012; Grilo & Mitchell, 2011).
CBT-E is an enhanced version of CBT allowing for greater treatment extension for hard to treat patient sub-groups and other EDs, such as EDNOS (Cooper & Fairburn, 2010). In low weight patients (BMI 15.5kg/m\(^2\)-17.5kg/m\(^2\)), CBT-E has shown to improve behavioural and cognitive outcome of ED indicators in 50% of the patient samples, however one third of patients did not engage or complete the program (Fairburn, 2011). As one of the aspects of CBT-E directly aims at improving therapy outcomes for patients with BN or EDNOS, it’s use in treatment has shown to be effective specifically resulting in long-term improvements when compared to a wait-list control group (Fairburn et al., 2009).

A second therapy method for AN is Cognitive Remediation Therapy (CRT) (Grilo & Mitchell, 2011). CRT is meant to strengthen weak cognitive capacities and develop compensatory strategies (Parentae & Herrmann, 2003). The body of studies evaluating this therapeutic method is again small, but promising (Grilo & Mitchell, 2011). Specifically, research has reported enhanced cognitive flexibility and significant improvements in global information processing for AN patients utilising this treatment (Tchanturia et al., 2008). Moreover, patients and clinicians rated this method to be not only an effective treatment, but also a practical treatment, as it was easy to deliver and subjectively useful to patients (Tchanturia et al., 2008).

A psychotherapy method that has been used for over 40 years in the treatment of AN is Family Based Treatment (FBT-AN) (Grilo & Mitchell, 2011). FBT-AN primarily targets adolescents and early adults (19-25 years of age) and is focused on teaching parents the re-feeding protocols used during inpatient treatment (Geller et al., 2012; Grilo & Mitchel, 2011). They are then able to implement these techniques at home. FBT-AN has been associated with better outcomes than no treatment, routine care, dietary advice, and supportive individual therapy (Dare et al., 2001; Hall & Crips, 1987; Le Grange, Crosby, Rathouz, & Leventhal, 2007). FBT–
AN is the most researched therapy utilised in treatment and is found to be a very effective treatment method and thus is the primary choice of AN treatment for adolescents and young adults (Grilo & Mitchell, 2011).

Family Based Therapy for BN and EDNOS is adapted from FBT-A (Le Grange et al., 2007). Like its parent treatment method, FBT-BN is targeted for adolescent and young adults. This model is mainly symptom focused and does not attempt to examine the root cause of BN (Grilo & Mitchell, 2011). Similar to FBT-A, this treatment aims to empower parents and disrupt the binging, purging and other pathological behaviours of young BN patients. However, the literature notes that patients are often unwilling to have their parent(s) involved in their treatment, thus this treatment method must be chosen with consideration of other psychotherapy models for BN (Grilo & Mitchell, 2011). A study done by LeGrange and colleagues (2007), showed that when 80 adolescents with the DSM diagnosis BN were assigned to either the FBT-BN group or an individual psychotherapy, FBT-BN showed a clinical and statistical improvement over individual therapy post treatment and at six-month follow-up. At the six-month follow-up, more FBT-BN patients were able to abstain from binge and purging episodes and showed greater results in terms of attitude and behavioural aspects of the ED psychopathologies.

Interpersonal therapy (IPT), is often used for patients with BN, and has the goal of improving psychological adjustment and to reduce psychopathology by focusing on the problematic aspects of interpersonal functioning (Freeman & Gil, 2004). Patients with EDs often describe interpersonal difficulties, as such the objectives of this therapeutic method are suited for the population with EDs (Geller et al., 2012). IPT has been recommended as an effective
alternative to CBT in BN patients, although, it must be noted that this method has shown slower response times then CBT when used in treatment.

Dialectical Behaviour Therapy (DBT), is also commonly used for patients with BN, it offers an intensive therapeutic approach for patients categorised as “difficult to treat” and with whom other therapy methods have failed (Grilo & Mitchell, 2011). This model uses a number of change strategies that focus on skill enhancement, effective behavioural accusation and emotional regulation strategies (Geller et al., 2012). Although DBT was first developed to treat individuals with a diagnosis of Borderline Personality Disorder, reviews of the initial findings of the implementation of DBT for ED treatment indicate that it is a promising alternative therapy method (Chen, Matthews, Allen, Kuo, & Linehan, 2008; Palmer et al., 2003). However, more randomised controlled trials are needed to establish the efficacy of this method for this group of patients (Chen et al., 2008; Palmer et al., 2003).

A new therapeutic method that can be used as an adjunct therapy to FBT-AN or alone is the Maudsley Model for Individual Treatment of AN (MANTRA). This method is unlike others as it focuses on difficulties or challenges that a person faces, and helps strengthen their resources and social support to deal with these challenges (Geller et al., 2012). MANTRA draws from empirically supported therapies, including CBT, IPT and DBT and combines them to create one main method (Geller et al., 2012). Although still recent in its application, there are data supporting the use of MANTRA. Patients significantly improved body mass index, eating psychopathology and motivation, and all with large effect sizes (Wade, Treasure, & Schimdt, 2011).

Written materials (e.g., self-help manuals), audio and digital video as well as computer-based materials and peer support self-help groups are available for patients with EDs (Geller et
They are helpful as they can be tailored for each individual and are more interactive than some of the other therapy methods (Grilo & Mitchell, 2011). These methods of support are a promising first step to recovery, however, the participation in a comprehensive evidenced-based treatment process is recommended. A review by Palmer et al., (2003) demonstrated that at the end of treatment, patients using self-help methods did not significantly differ in their rates of abstinence of binge purging episodes from the wait-listed patients. However, the self-help therapies did provide greater improvements of eating disorder symptoms, psychiatric symptoms and interpersonal functioning excluding depression (Perkins, Murphy, Schmidt, & Williams, 2006)

**2.5.2 Pharmacotherapy.** Pharmacotherapy is a treatment method involving the administration of pharmaceuticals and is most commonly used in support of psychotherapeutic treatment (Geller et al., 2012; Grilo & Mitchell, 2011). Pharmacotherapy varies across the different EDs, the following section will describe the current trends in pharmacological prescription for AN, BN and EDNOS.

Few medications have been found to reduce the symptoms of AN alone, but they do help with comorbidities in combination with psychotherapy (Geller et al., 2012). For instance, different classes of medication have been utilised in the treatment for AN, with the aim of improving weight, appetite, shorten recovery time or to aid in reducing the core symptoms (e.g., weight and shape issues, fear of fatness etc.) of AN (Grilo & Mitchell, 2011). Compliance with medications is often difficult in those with AN, particularly for patients who are prescribed medication to increase weight and those that include weight gain as a side effect (Geller et al., 2012). Some of the most frequently administered medications are antidepressants (e.g., fluoxetine bupropion, sertraline and citalopram) and first and second-generation antipsychotics
(e.g., Olanzapine, quetiapine, amisulpride, risperidone, aripiprazole) (Grilo & Mitchell, 2011). Due to the influential role of serotonin and its common abnormalities in these illnesses many of the medications prescribed fall under the category of serotonin specific re-uptake inhibitors (SSRI). These medications block the reabsorption of serotonin in the brain (Mayo Clinic Staff, 2013). The lack of reabsorption changes the chemical composition (Mayo Clinic Staff, 2013). The chemical change helps the acceptance and delivery of chemical messages improving mood and eating disorder psychopathologies overall (Mayo Clinic Staff, 2013). Although these medications are commonly prescribed for AN, there is a lack of empirical evidence supporting their efficacy for patients with AN (Grilo & Mitchell, 2011).

The pharmacological treatment of BN has more optimistic results than that of AN (Geller et al., 2012). The use of antidepressant medications, particularly fluoxetine (the gold standard), has shown to have positive effects (Geller et al., 2012; Grilo & Mitchell, 2011). A synopsis of medical trials up to 2005 has also identified fluvoxamine, citalopram, desipramine and brofameone as “good” additions to treatment (Grilo & Mitchell, 2011). Although there is less empirical support for antidepressants such as topiramate and ondansetron, they have also shown to help with BN’s symptoms and pathologies (Grilo & Mitchell, 2011). Given the data demonstrating that CBT is an equally effective treatment for patients with EDs, the recommendation is that psychotherapy precedes pharmacological treatment, keeping in mind that pharmacotherapy is helpful to over-all treatment prognosis in the appropriate patient population (Grilo & Mitchell, 2011).

For patients with EDNOS pharmacotherapy improves prognosis when compared to placebo in patients with BED (Geller et al., 2012). Despite this, medications have not enhanced CBT results, nor improved prognosis when administered alone (Geller et al., 2012).
Pharmacological agents have mainly been reviewed and tested in adult populations, thus results may not be generalised to a younger population (Vancampfort et al., 2014). In Canada, the clinical indications for patients with BED generally recommend symptom management, thus further studies are needed to clarify the role of pharmacotherapy in patients with a strict EDNOS (or OSFED) diagnosis.

2.5.3 Nutrition counselling. Given the essence of EDs, dietitian led nutrition counselling is an essential component of ED treatment. The dietary plans created can be tailored to the symptom severity and level of engagement for each patient (American Dietetics Association, 2001). Dietitians establish and monitor dietary and behavioural goals in a step-wise manner, working individually or in groups with patients to help with meal planning (Grilo & Mitchell, 2011). There can also be other topics addressed by the nutritionist in treatment, including; making changes to food and fluid intake, compensatory behaviours, exploring nutritional beliefs and knowledge, identifying and responding to hunger and fullness cues, use of appropriate vitamins and mineral supplements, and understanding food allergies and intolerances (American Dietetics Association, 2001; Geller et al., 2012). The role of a dietitians can also extend to exploring ambivalence about nutritional changes with patients as well as assisting patients to cope with anxiety related to new or feared foods, food preparation, grocery shopping, and social eating (American Dietetics Association, 2001; Geller et al., 2012). In patients with AN, nutritional counselling alone has found to be ineffective without combined psychotherapy (Grilo & Mitchell, 2011). Nutritional counselling with an ED trained nutritionist is an adjunct therapy widely supported by health professionals (Geller et al., 2012).

Psychotherapy, pharmacotherapy and nutritional counselling, are the three primary treatment strategies for EDs. Progress has been made in the treatment methods for EDs, but in
general it has been found that the current treatment of AN, BN and EDNOS is only moderately successful (Vancampfort et al., 2014). To increase treatment effectiveness, researchers and clinical health professionals alike have indicated that supplementary treatments are needed to improve these traditional ED treatment methods. Many alternative therapy methods are currently utilised in ED treatment. Music and massage therapy have shown some promise, however the use of exercise is being considered more often as a supplementary treatment (Beumont, Arthur, Russell, & Touyz, 1994; Duesund & Skarderud, 2003; Hart, Field, & Hernandez-Reif, 2001; Justice, 1994; Neumark-Sztainer, 2013; Thien, Thomas, Marking, & Birmingham, 2000).

2.6 Exercise in the Treatment of EDs

2.6.1 Current view. There is a growing body of knowledge highlighting the effectiveness of exercise in the treatment of EDs and associated illnesses (Fernandez-del-Valle et al., 2014; Tokumura et al., 2002; Vancampfort et al., 2014). Most practitioners perceive exercise as a significant component in the pathogenesis and maintenance of EDs (Hechler, Beumont, Marks, & Touyz, 2005). Some practitioners discourage the use of exercise based on the perception that exercise could have a detrimental effect on weight gain for patients with EDs (Davies et al., 2008). This is particularly related to the understanding that exercise is a causal factor for EDs and the common emphasis on expending calories to reduce weight by engaging in excessive exercise (Bratland-Sanda et al., 2010; Hausenblas, Cook, & Chittester, 2008). Abusive exercise habits are prevalent in 80% of AN patient, 55% BN patients and 31.9% of EDNOS patients (Dalle Grave et al., 2008; Moola et al., 2014; Penas-Lledo, Vaz Leah, & Waller, 2001; Vancampfort et al., 2010). Compared with patients who do not abuse exercise, patients who do abuse exercise display a higher level of psychological distress and ED psychopathology (anxiety, perfectionism, obsessions, compulsion and persistence) (Meyer, Taranis, & Touyz, 2008). As a
result, they are often correlated with longer time spent in hospital higher rates of relapse and illness chronicity and an unfavourable prognosis (Hausenblas et al., 2008; Meyer et al., 2008). The use of exercise as a means to purge calories and/or inappropriately regulate affect after food consumption has further resulted in caution in prescribing exercise as a beneficial adjunct therapy for EDs (Hechler et al., 2005). Together these reasons compound health practitioners’ fears that inappropriate exercise behaviours will lead to relapse and be a counter indicator of a healthy prognosis.

Although this perception may, in some degree be valid, no studies have found any adverse effects on weight when exercise was managed appropriately (Carei et al., 2010; Fernandez-del-Valle et al., 2014; Lutter & Smith-Osbourn, 2011; Tokumura et al., 2002). In fact, it has been suggested that when prescribed appropriately, exercise improves physical and mental health markers of the disease, resulting in a more positive prognosis (Hausenblas et al., 2008; Ng, Ng, & Wong, 2013; Moola, Gairdner, & Amara, 2013; Vancampfort et al., 2014). For instance, it was found to improve cardiovascular health, muscle strength and function, skeletal health (Chantler, Szabo, & Green, 2006; Fernandez-del-Valle et al., 2014), as well as improve body image, self-esteem, and anxiety and depressive symptoms (Burbach, 1997; Daley, 2008; Jayakody, Gunadasa, & Hosker, 2014; Ng et al., 2013; Vancampfort et al., 2014). It is important to note, however, that the research concerning the role of exercise as a supplementary treatment method for EDs is very limited and requires further investigation to understand how to sufficiently incorporate or modify an exercise protocol to best meet the needs of this patient population (Geller et al., 2012; Hausenblas et al., 2008; Moola et al., 2013; Ng et al., 2013; Vancampfort et al., 2014). The following provides an overview of the very limited research literature available concerning exercise interventions as a supplementary treatment for EDs.
2.6.2 Theoretical framework. To support the addition of exercise into the treatment of EDs, recent studies have shown that exercise dependence mediates the relationship between exercise and eating pathologies (Cook & Hausenblas, 2008). The framework proposed by Cook and colleagues (2011) supports exercise’s inclusion into treatment as it suggests that the psychological motivation to exercise (resulting in exercise dependence), and not the behaviour of exercise itself is the critical component that mediates the role of exercise in EDs (Hausenblas & Downs, 2002) (Figure 1). Suggesting that if there is an ability to change the motivation, and promote the behaviour in a healthy fashion is can be beneficial to patients.

Cook and Hausenblas (2008) have proposed framework summarising the effects of exercise on EDs, specifically addressing how exercise has a positive influence on physiological, psychological and social relationship aspects in patients with an ED (Cook & Hausenblas, 2008). Physiologically, exercise improves chronic pain, insomnia, tendencies of substance abuse, osteoporosis and obesity (Cook & Hausenblas, 2008; Cook, Hausenblas, Tuccitto, & Giacobbi, 2011). Psychologically, exercise has shown to improve risk and maintenance factors of self-esteem, anxiety, depression and negative body image (Cook & Hausenblas, 2008; Cook et al., 2011). Given that those with EDs often have negative social interaction tendencies, exercise can also help in improving social interaction (Cook & Hausenblas, 2008). In addition, regular exercise decreases overall stress and regulates mood, helping to better tolerate stress of everyday life.

Centrally, this framework is based on the reciprocal relationship found in a healthy population, in which exercise improves wellbeing, leading to increased exercise behaviours, and thus further wellbeing (Cook & Hausenblas, 2008). Preliminary research demonstrates that this reciprocal relationship can also be applied to those with an ED. When applying the reciprocal
relationship to a population with EDs, exercise positively influences the risk and maintenance factors of the ED by decreasing pathological thinking and behaviours (Figure 1). This improves health and in turn improves the prognosis of the ED, further promoting the use of healthy exercise behaviours in a circular manner (Cook & Hausenblas, 2008).

Cook and colleagues (2011) tested the relationship outlined in the model in a normal weight population. They tested 539 university studies (75.5% female) with a normal BMI (mean= 23.64kg/m²) and found that the influence exercise had on psychological wellbeing (beyond the physical benefits) was associated with decreasing the risk of an ED in a normal weight population. Despite the study not being conducted in a population with EDs, the findings underlined the importance of the influence exercise can have on mental health in the age demographic that is most at risk for these illnesses. This preliminary framework and study helps to better understand the mechanisms at work when prescribing exercise in a population with EDs and gives researchers the ability to isolate important aspects of a patient’s health regarding exercise and better prescribe exercise in this population as a whole.

*Figure 1. Conceptual Framework for Exercise in ED*
2.6.3 Resistance training. Recovery of EDs focuses mainly on total body mass, fat mass, percentage of body fat and BMI, often ignoring the replenishment of muscle mass and function (Fernandez-del-Valle et al., 2014). Without adequate recovery of muscle mass, the functional capacity of muscle is compromised. In patients with EDs, resistance training (RT) can enhance muscle strength (and recovery), body function, and body composition (Beumont et al., 1994; Chantler et al., 2006; Fernandez-del-Valle et al., 2010, 2014). Fernandez-del-Valle and colleagues (2010), examined the effects of a low intensity resistance program (20-30% of max increased to 40-60% of max) in the treatment of patients with AN (n=11) and concluded that although the program was well tolerated, it was not overtly influential on outcomes of body composition or psychological health. However, in a subsequent study the authors tested an eight-week high intensity (loads starting 6 repetitions of 70% of their maximum) protocol in a comparable patient population (n=18) with a control group (n=18) and reported improvements in body composition, strength and agility. In addition, they found no adverse effects in BMI between the groups, however the training group performed better in strength challenging tasks (bench press, leg press, etc.) and showed significant improvements in The Time Up and Go-3 and Time Up and Down Stairs tests (Fernandez-del-Valle et al., 2014). The metabolic load was not detrimental at higher intensities in this population and the exertion was overall positive for this patient group. Given RT’s lower metabolic cost in comparison to aerobic training, this training modality can ease some of clinicians’ concern of excessive caloric expenditure (Chantler et al., 2006; Fernandez-del-Valle et al., 2010). For these reasons, RT is gaining popularity as a supportive treatment for EDs. The preliminary study incorporating RT in treatment was in 1993, where an intervention group was compared to a control group in patients with AN. The study incorporated individualised RT program in conjunction with central therapy methods (i.e.,
psychotherapy, pharmacotherapy, and nutrition counselling) (Touyz, Lennerts, Arthur, & Beumont, 1993). The study concluded that the intervention group gained weight at the same rate as the control group (Touyz et al., 1993). Szabo & Green (2002) incorporated light resistance training into patients with AN (n=7) treatment and after eight weeks found improvements in body mass, BMI, percent body fat, lean body and fat mass, and psychological wellbeing for a hospitalised AN group when compared to a control AN group (n=7). Chantler et al., (2006) also investigated the effects of a RT program incorporated into treatment of AN patients and found significantly greater increases in BMI and strength (i.e., peak torque of knee extensors and elbow flexors) in the intervention group (n=7) compared to the control group (n=7) (Chantler et al., 2006). Lastly, a sample of patients with a variety of EDs were split into an excessive exercising group of patients (n=38) and a non-excessive exercising group of patients (n=27). Bratland-Sanda et al., (2010), found that when a RT and group sport sessions were incorporated into treatment twice a week, excessive exercise tendencies were reduced, in addition to ED psychopathologies, and these findings were correlated with a decline in patient’s exercise dependence scores and the perceived importance of exercise in regulating affect (Bratland-Sanda et al., 2010).

Participating in prescribed and controlled RT exercises increases motor performance skills, bone mineral density, and physical capacity and improves aspects of mental health (quality of life, depression and anxiety) within patients with AN (Chantler et al., 2006; Fernandez-del-Valle et al., 2010, 2014; Szabo & Green, 2002). Given that patients with AN are at greater risk for complications when engaging in exercise, these studies showed that this supportive treatment can benefit the population with EDs without being limited by the type of ED. Overall, strength training was well tolerated by all levels of the patient population and
feasible within treatment protocols (Chantler et al., 2006; Fernandez-del-Valle et al., 2014).

2.6.4 Cardiovascular training. Few studies have examined the effects of anaerobic training for patients with EDs. The first, and also one of the most compelling studies involved a 16-week aerobic and anaerobic protocol incorporated into the regular program of inpatients with BN. In this study, three treatment groups were examined, including Group 1 (an exercise group combined with CBT and nutritional therapy: Group 2 (CBT only) and Group 3 (nutritional therapy only) (Sundgot-Borgen, Rosenvinge, Bahr, & Sundgot Schneider, 2002). Patients diagnosed with BN engaged in 45 minutes of jogging at 50-70% of their max heart rate with 15 minutes of stretching. When compared to the non-exercising groups (Group 2 & 3), the exercise group combined with CBT and nutrition therapy (Group 1) showed significant improvements in bulimic symptoms (i.e., binging and binging and purging episodes) as well as psychological variables such as drive for thinness and body dissatisfaction, promoted self-regulation, improved reactions to everyday stress and decreased bodily tension in patients with BN (Sundgot-Borgen et al., 2002). In addition, the positive outcomes were maintained longer in the group that combined CBT with exercise than with CBT or nutritional counselling alone, concluding that exercise is an important aspect of treatment in normal weight patients with BN (Sundgot-Borgen et al., 2002). In another study focused on the AN-R (AN-restrictive) population, a thirty-minute biking protocol at anaerobic threshold was incorporated into their treatment and resulted in improved exercise capacity (endurance time, VO\textsuperscript{2} at anaerobic threshold and peak VO\textsuperscript{2}) and BMI beyond that of the control group after a one year follow up. In addition, this exercise protocol did not compromise the onset of menstruation nor increase risk of AN relapse (Tokumura et al., 2002).
Despite the positive outcomes of aerobic exercise in the treatment of EDs, factors such as safety, individual circumstances and type of activity must be taken into consideration before being incorporated into the treatment protocol. For instance, Beumont et al., (1994) discouraged jogging due to the dangers of orthopaedic damage, but indicated that other forms of activity, such as cycling, swimming and low impact aerobics are appropriate for the population with EDs, particularly patients with AN (Beumont et al., 1994). In addition, supervision and psycho-education are necessary steps to the success of the incorporation of this adjunct treatment.

2.6.5 Combined protocols. In 1993, the first graded exercise program with both aerobic and anaerobic modalities of exercise were added into patient (n=32) treatment protocols for 10-15 weeks dependant on patient stay. The graded intervention, meaning that patients graduated to higher exercise intensities dependant on their recovery progression, resulted in positive effects on body weight, BMI, body fat and lean body mass (Russell et al., 1993). A second graded protocol graduated patients to different levels of exercise, dependant on their weight. This protocol did not have as compelling results, however when compared to the control (n=7), the exercising group (n=8) scored higher in markers of improved quality of life and better compliance with treatment was noted in the exercise group (Thien et al., 2000). Overall, this research provides some support for use of a combined exercise protocol, reporting significant effects on psychological and physical health markers, unfortunately, these findings have yet to be assessed in combination with body composition.

2.6.6 Alternative physical activities. Yoga has gained popularity for inclusion in treatment of EDs due to its potential ability to facilitate mind body awareness and mindfulness psycho-education while engaging in the activity (Neumark-Sztainer, 2013). A randomised control trial by Carei et al., (2010) demonstrated that a one-hour yoga session incorporated into
ED treatment twice a week produced better overall outcomes than standard ED treatment (Carei et al., 2010). In the intervention group, the global score for the Eating Disorder Examination (EDE) improved as well as individual sub categories (i.e., weight concern, shape concern, eating concern and restraint). Measures of depression and anxiety also significantly improved over time (Carei et al., 2010). After the yoga session, intervention participants reported decreases in food preoccupation (compulsive and obsessive thoughts about food and calories) compared to the control group and no adverse effects on mental and physical health were noted (Carei et al., 2010). Overall, yoga has been concluded to improve body awareness, responsiveness to treatment and overall wellbeing (Neumark-Sztainer, 2013). Given that it is easily accessible and cost effective, and that the data has shown promising results, this method of treatment, while still in its infancy, is worthy of further attention (Neumark-Sztainer, 2013).

The use of Thai Chi as a supportive treatment has also shown promise. A study by Catalan-Matamoros, Helvik-Skyjaerven, Labajos-Manzanares, Martinez-de-Salazar-Arboleas, & Sanchez-Guerrero (2011), incorporated a Thai Chi like Basic Body Awareness intervention with a cognitive activity which reinitiates the ability for the mind to appropriately interpret sensations from the body, thus creating a more realistic perspective of self and providing improvements in body image (Catalan-Matamoros et al., 2011). The basic body awareness intervention included 14 patients with EDs who participated in face-to-face sessions over a seven-week period. All measures, including the Eating Disorder Inventory, Body Attitude Test and Eating Attitude Tests, reported significant improvements, particularly decreased drive for thinness, regulation of hyperactivity and improved feelings towards one’s body (Catalan-Matamoros et al., 2011). Although this method was found to be effective in outpatients with ED, more research is needed to replicate the positive results.
In adapted physical activity, the body is used to forget the body (Duesund & Skarderud, 2003). Adapted physical activity aims to incorporate physical activities that help patients reduce the persistent of over concerns with body shape and weight (Duesund & Skarderud, 2003). These experiences, that combine physical and social activities, intend to create a shift in awareness from the objectification of the body to a more profound and subjective experience of one’s own body. A study by Duesund & Skarderud (2003), examined patients with severe and persistent AN symptoms (n=7), who were exposed to a two-week adapted physical activity intervention taking place in a sport complex (Duesund & Skarderud, 2003). The intervention incorporated three to four hours of activity each day. Participants had schedules they helped create with various activities including hiking on trails, ball games, skiing, horse riding and pool activities (Duesund & Skarderud, 2003). No negative outcomes were experienced related to weight, measures of eating pathologies (assessed by the Eating Disorder Inventory-2C) or one’s attitude towards their body (evaluated by the Body Attitude Test). Furthermore, the study’s qualitative analysis examined four distinct aspects of the illness, including: ‘forgetting the body’, ‘reminders of the body’, ‘phases in the illness’ and ‘social fellowship’ (Duesund & Skarderud, 2003). Patients identified that riding and ball games positively influenced ‘forgetting the body’. Negative ‘reminders of the body’ were present when patients became bored and related this sentiment to obsessional thoughts of exercise compulsions. The ‘phase of the illness’ that a patient was currently in (chronic or acute) affected how they perceived activities. Chronic patients felt more responsible for their health, while acute patients, those ill for a shorter period of time, felt an increased need to exercise inappropriately. Activities engaged in social settings positively affected the patient’s ‘social fellowship’, providing patients with insight into aspects of their social functioning skills. This study concluded by suggesting that in the context of high
quality, secure medical practice, adapted and exercise in general, may be beneficial for therapeutic relationships and suggests that adapted may be a beneficial supplement to AN psychotherapy (Duesund & Skarderud, 2003).

In a study investigating how an exercise protocol in ED treatment can reduce exercise abuse in women, Calogero & Pedrotty (2004) incorporated a combined protocol, which included stretching, yoga, Pilates, partner exercises, strength and balance training, aerobic activities and recreation activities. These combined activities where used to support the standard treatment (psychotherapy, pharmacotherapy (patient dependant) and nutritional counselling) of 127 patients (AN-R = 43, AN-B/P=20, BN=42, EDNOs = 22) (intervention group) and included 60 minutes sessions two to four times per week. The control group (n=127) only received standard care. This study found positive and significant differences for the intervention group’s emotional commitment to exercise, exercise involvement and exercise rigidity when compared to the control (Calogero & Pedrotty, 2004). Of note, the exercise group gained one third more weight than did the control group.

2.7 Summary

Exercise as a prescription for health is a new and somewhat controversial approach to ED treatment. The research has demonstrated that exercise can have significant positive effects on physiological, psychological and social health outcomes. Physically, exercise has shown to improve body mass, cardiovascular health, decrease risk of osteoporosis, decrease sleep disturbances and reduce pain (Hausenblas et al., 2008; Moola et al., 2013; Vancampfort et al., 2014). Psychologically, it is related to decreased depression, anxiety and perceived stress, and increased positive affect, self-esteem, self-regulation and body image (Hausenblas et al., 2008; Vansteelandt, 2007). The elements of improving self-esteem and body experience were
identified by patients as two of the most important elements to their recovery (Vanderlinden, Buis, Pieters, & Probst, 2007). Socially, exercise improves social interactions and social support, all of which contribute to improved quality of life (Duesund & Skarderud, 2003; Hausenblas et al., 2008). To help better conceptualise the mechanisms at work, it is important to understand the theoretical underpinnings supporting exercise for the population with EDs. Although there is little knowledge as to what is the safest and most effective type and dose of exercise, further studies will add to this body of knowledge and inform practice protocols (Chantler et al., 2006; Fernandez-del-Valle et al., 2010; 2014; Szabo & Green, 2002; Vancampfort et al., 2014). Greater insight and understanding will not only add to the research literature, but most importantly it will impact clinical practice, specifically resulting in a more favourable prognosis, increased hope for patients and their loved ones, and an enhanced quality of life.
CHAPTER THREE-METHODS

3.1 Overview

The study design was qualitative in nature and used an exploratory approach to collect and analyse data that represented the perceptions and beliefs of health professionals concerning exercise as a supportive treatment method for EDs. The high prevalence of EDs in women, and the exploratory nature of this study, combined with the medical differences in symptoms between males and females, resulted in this project focusing on the female population with EDs. Specific research questions guided the project, a rationale for the use of qualitative methods, the role of the researcher within this methodology, the sampling and participant recruitment procedures as well as details concerning the data collection and analysis protocol are outlined below. This research study received ethical approval from the Behavioural Research Ethics Board at the University British Columbia, Okanagan (#H15-01276).

The two main research questions that guided the chosen methodology for this study are:

1) What are the selected panel experts’ perceptions and opinions of the role and value of exercise in the treatment and management of EDs?

2) What do the selected panel experts recommend for incorporating exercise as a supportive therapy to ED treatment?

3.3 Rationale for Qualitative Methodology

Qualitative research involves collecting data in a natural environment and analyzing this data interpretively, taking note of patterns and trends within that data (Creswell, 2007). Defined as being primarily naturalistic and inductive, qualitative inquiry works to draw conclusions from a data set without a pre-existing framework or theory (Mayan, 2009). Given the early stage of the current research topic, this project utilised an exploratory descriptive approach. Descriptive
research aims to document observations of a phenomenon and explore the factors that influence and interact with it (Sandelowski, 2000).

Qualitative research is a viable research approach when detailed information from a unique perspective is valued, such as in the collection of perceptions, beliefs, and opinions on a specific topic (e.g., exercise in EDs) for a specialised population (e.g., female population with EDs) (Creswell, 2007; Latimer-Cheung et al., 2013). To acquire the details and perspectives specific enough to clearly understand the phenomenon at hand, it was important that any caveats or crucial elements could be clearly communicated by the selected panel of experts to the researcher. Information collected via a quantitative protocol would not have placed value on details, context and subjectivity, thus in this context a quantitative protocol would not be appropriate alone. As a result, semi–structured qualitative interviews were used to ensure that details and subjective opinions were preserved within the data (Creswell, 2007). Given the small body of literature pertaining to the role of exercise in the treatment of EDs, semi-structured qualitative interviews allowed the opportunity to collect more information than which is currently available, thereby expanding the existing body of literature.

3.4 Role of Researcher

The role of the researcher was to gain an in depth understanding of the perspectives, research knowledge, and expert opinions of the panel concerning the incorporation of exercise in the treatment of EDs. As part of this qualitative analysis, the researcher (DQ) performed all data collection, analysis, and interpretation of the results and ensured dissemination of the results. A more neutral stance is frequently adopted in quantitative inquiry; however, quantitative research was not appropriate or conducive to the research goals of this study (Santos, 2014). Qualitative protocols required the researcher to be more involved with participants and data collection as to
better understand the phenomenon in question. As a result, the researcher needed to be cognisant that possible bias may ensue. A personal bias that may have influenced the outcome of this project was the main researcher’s (Quesnel) background in Kinesiology. In hopes of mitigating this bias, strategies of rigor were implemented and are described further in this section.

3.5 Sampling and Participant Recruitment

Purposeful sampling, specifically, criteria sampling, was used to select participants. Purposeful sampling ties one’s participant selection to the objectives of the research (Palys, 2008). More specifically still, criteria sampling is defined as a sampling method in which cases or participants are selected when they have met a predetermined criterion of importance (Patton, 2002). Criteria sampling is appropriate in research that requires individuals to provide their best information about the topic in question (Mayan, 2009). This method of participant sampling has been utilised in general health research, ED specific research and in the creation of guidelines for specialised populations (Hechler, Beumont, Marks, & Touyz, 2005; Pryde, 2009; Santos, 2014). This sampling method was used to produce a sample from both a clinical and research background, ensuing variation in the reported opinions and perceptions of the topic at hand.

Participants selected by criteria sampling formed the expert panel. They represented a variety of disciplines, and all worked in the area of EDs. Given that different disciplines have a varied understanding of the effects of exercise on ED, this multidisciplinary participant body provided diverse perspectives on the research topic, and a varied understanding of the impact that exercise has as a treatment method for EDs. This panel included, but was not limited to; psychiatrists, psychologists, registered dietitians and mental health nurses. The information outlined below describes the inclusion criteria used in this study:
1) Participants must have had three years of full-time experience working in the field of EDs.

2) Participants must have held professional credentials and be registered with their designated licensing body.

3) Participants must have had a professional interest in the role of exercise in ED treatment. This could have been demonstrated through active research and/or clinical practice experience.

4) Participants must have been able to understand and speak English or French.

Including health professionals that have worked in the field of EDs for a minimum of three years ensured that each participant accumulated the necessary in-depth knowledge of the field, was familiar with the current research, and had related clinical experience. The necessity of holding a recognised professional degree, for example, Master’s level degree, Bachelor’s degree, or diploma, established a recognised standard of expertise by academic institutions. This ensured competency in the academic field and protected the overall quality of the expert panel’s opinion. As the topic of interest pertained to exercise in the treatment of EDs, the participating body must have had knowledge on this topic. However, this qualification could be obtained in several different ways, including personal experiences with patients, in their training, and/or research in the field.

The researcher (DQ) identified the potential participants by one or more of the following methods: their published work on the topic; networking at professional conferences; work and volunteer experiences in the ED field; and through professional connections. Given the method of identifying participants for this study, some biases may have ensued due to the personal connections the researcher (DQ) had with a number of potential participants. The researcher
continued to contact various ED experts who met the outlined criteria until a sufficient number of experts agreed to participate.

Recruiting 10-15 participants ensured comparison and contrast capability within the data (Santos, 2014). Saturation is reached when no new data emerges within the sample (Mayan, 2009). Saturation was reached in previous research with a similar objective and methodological protocol, using a range of 10-15 participants (Latimer-Cheung et al., 2013; Levy, 2013; McMonginal, 2007). If too many interviews are conducted the process of analysis may be time consuming with little additional value added to the data set (Kvale, 2008). If the sample is too small, it results in restrained analysis methods and increases the risk of the results not being transferable (Kvale, 2008).

3.6 Protocol

The potential participants were informed of the study via an invitation e-mail (Appendix B), which included information about the role of the researcher, why the participant was chosen and an explanation of the study. The email provided a statement indicating that participation is completely voluntary and that participants may withdraw from the study at anytime without consequence or prejudice. Interested participants were asked to reply to the email indicating a convenient time they could be contacted by phone to organise a date and time for the interview.

Prior to all interviews being conducted, consent forms were emailed to all participants. Participants were asked to review this document, sign it, and return it to the researcher before the start of the interview session. Participants were encouraged to contact the research if they had any questions or concerns. In addition to written informed consent, verbal consent was also obtained at the start of each interview session. Once consent was obtained, a brief overview of
what the interview would entail was communicated to the participants prior to the start of the interview.

All attempts were made to conduct interviews face-to-face, however, based on geographic location, project resources and availability, some of the interviews were conducted via Skype or telephone. Face-to-face interviews were chosen as the main approach to the interview process as they provided a greater opportunity to obtain in-depth information as they allowed for social cues to be expressed freely and to be better understood (Carruthers, 1990; Opdenakker, 2006). In addition, having had the ability to control the ambiance of the interview added to a positive conversation flow, allowing for easier discussion and increased sharing of knowledge (Opdenakker, 2006). Guided by a pre-determined interview guide (please see Appendix C), participants were asked a number of open-ended questions concerning the topic area. Examples of open-ended questions included: “Despite just having filled out the demographics form I was wondering how long you have worked in the field of eating disorders and what drew you to the field?”. The principal research (DQ) wrote the interview guide in accordance with the research questions. It was further informed by the literature on exercise and EDs, and by the gaps in the current body of literature. All interviews were conducted by the principal researcher (DQ) and audio-recorded using a digital recorder.

All audio-recorded files were transcribed verbatim by the principal researcher (DQ). Once transcription was completed, the researcher sent participants, via email, their own transcribed interview for review. Participants were encouraged to review the document and provide further explanation, description or revisions where necessary. They were also encouraged to contact the researcher if they had any questions or concerns regarding the transcribed document. Participants were given two weeks to make necessary revisions and return
the revised document to the researcher. Participants who did not have any revisions were asked to inform the researcher, by email, that they were satisfied with the document in its current form. Once the document had been reviewed and accepted by each interviewee, data analysis began.

3.7 Methodology Procedures

3.7.1 The expert panel. The expert panel provided a pool of knowledge that extended beyond what the current small body of literature on exercise in the treatment of EDs provided. The current body of knowledge holds significant limitations in terms of protocol development and justification, thus this panel extended the limited body of knowledge, as well as provided clinically relevant information that supported and justified the use of exercise as a supportive treatment to ED therapies (Hausenblas, Cook, & Chittester, 2008; Fernandez-del-Valle et al., 2010; Vancampfort et al., 2014; Zunker, Mitchell, & Wonderlich, 2011).

3.7.2 Semi-structured interviews. The semi-structured interview is a directed conversation; specifically, it is a qualitative data collection method in which a researcher asks an informant a series of predetermined, open and closed-ended questions, changing the order based on the interviewer’s perception of what is appropriate (Carruthers, 1990; Given, 2008; Opdenakker, 2006). It is a professional interaction, which goes beyond the exchange of an everyday conversation and becomes a directed approach of questioning and listening to obtain tested knowledge (Kvale, 2008).

Semi-structured interviews, used in this study, were effective and valuable as it gave the researcher the opportunity to better understand the participant’s opinion and the reasoning behind that opinion, much more than would a mailed questionnaire for example (Carruthers, 1990). Furthermore, the researcher had greater control over the topics in the interview in comparison to an unstructured interview and in contrast to a survey, and this allowed for a greater number of
responses to each question (Given, 2008). This method has a long history in the social sciences and is a powerful method of understanding and treating human behaviour issues (Kvale, 2008). Previous ED research utilised this method, further confirming its usefulness and validity for this type of research (Hechler et al., 2005; McMonigle, 2007; Levy, 2013; Pryde, 2009; Santos, 2014).

3.8 Data Analysis

In an iterative process with data collection and transcription, thematic analysis, supported by NVivo10, was utilised to analyse the data for this project. Thematic analysis is commonly utilised in social science research and has been previously used in ED specific research (Braun & Clarke, 2014; Buser, Parkins, & Buser, 2014; Guest, MacQueen, & Namey, 2012). This method of data analysis emphasised examining, pinpointing and discovering patterns and identifying themes within the data set (Braun & Clarke, 2006). The patterns or themes identified within the data were the description of the phenomenon examined by the research questions. Thematic analysis is used when the existing body of knowledge on a topic is limited, as is the body of knowledge concerning exercise in ED treatment (Hseih & Shannon, 2012).

There are six phases in thematic analysis that have been outlined by Braun & Clarke (2006). The first step to this analysis process began with the researcher carefully reading all the data, and becoming familiar with it to begin to recognise common patterns (Braun & Clarke, 2006). Notes were made in the margins to highlight different patterns within the raw data set and foreshadowed the process of coding (Braun & Clarke, 2006).

In the second phase of thematic analysis, the initial coding began. Coding was a process by which the researcher organised and selected sections of datum that were reoccurring and pertained to the research questions (Braun & Clarke, 2006; Miles & Huberman, 1994). Codes
were tags or labels used for assigning units of meaning to the datum descriptive of the phenomenon in question (Miles & Huberman, 1994). The data was simplified, reduced and compiled into different categories or codes (Braun & Clarke, 2006). This process helped to further develop the data set, and re-conceptualised it to find more possibilities for analysis (Braun & Clarke, 2006). To appropriately execute this process, Siedle and Kelle (1995) suggested that the researcher a) note data relevant to the phenomenon in question, b) collect examples of the phenomenon within the data set, and c) analyse data to find similarities, difference and patterns within it to form codes (Coffey & Atkinson, 1996). Codes were reassessed, refining the data within, to add, subtract, combine and split codes appropriately (Braun & Clarke, 2006; Miles & Huberman, 1994). These codes may have been tagged or labeled to the data set based on the research question(s) (Braun & Clarke, 2006). Later these codes were further analysed to create themes.

In the third phase, themes were formed. Codes were examined for over-arching themes between them (Braun & Clarke, 2006). Themes were different than codes as they pertained to what the data meant to the research question. They described the overall outcome of the data within the codes (Braun & Clarke, 2006). The relationships between codes were examined and their relevancy to each other was evaluated, resulting in codes being combined, developed or re-labeled to form initial themes. This process was supported by the incorporation of graphic models that include; charts, tables, graphs etc. (Braun & Clarke, 2006). Displaying the data helped future analysis, this style of information depiction helped to draw conclusions and further organise data depiction (Guest et al., 2012; Miles & Huberman 1994).

In phase four, the themes created in stage three were reviewed and refined (Braun & Clark, 2006). The researcher examined the emerging themes and evaluated how they were
supported by the data and how they related to the research question. Using two levels of examination, the themes were compiled and/or separated accordingly (Braun & Clarke, 2006). In the first level, the codes forming the themes were reviewed to ensure that they were coherent with the identified themes. The second level of review considered the validity of the raw data within the codes supporting the theme. The researcher evaluated if the themes appropriately and accurately related back to the raw data set. This process ensured that the themes accurately reflected the participant’s experiences (or opinions and thoughts in this case). At this time, new codes were created and added to further support the theme (Braun & Clarke, 2006). Once the researcher was satisfied with the revision process, phase five began.

In phase five, the researcher began to label and define the identified themes (Braun & Clarke, 2006). The definition explained the essence of each theme, allowing the researcher to better understand which aspects of the data set were being captured by a specific theme and how each theme related to the data set and research question (Braun & Clarke, 2006). At the end of this phase, the researcher was able to define what each theme consisted of and had the ability to explain each theme in a few sentences. The final step was to review the themes (for example “Fit for Fitness”) that emerged and write the final report and concluding statements (Braun & Clarke, 2006; Miles & Huberman, 1994).

3.9 Data Storage

The data was securely stored in digital form at UBCO on a laboratory computer accessed by the principal investigator (Caperchione) and co-investigator (Quesnel). It was also stored on the co-investigator’s (Quesnel) work laptop. The printed data (demographics, questionnaires, transcribed interviews) were securely locked in a cabinet in the locked office (at UBCO) of principal investigator, Dr. Caperchione. Once each interview was completed and transcripts
approved, interviewers were recognised only by their identification number. All data will be stored for a minimum of five years after publication of results.

3.10 Rigor

Rigor is the demonstration of how and why the findings of a particular inquiry are worth attention (Mayan, 2009). In quantitative research, rigor is determined by three criteria: validity, generalisability/transferability and reliability (Mayan, 2009). To certify rigor within this qualitative research project, these three same criteria were taken into consideration. In quantitative data, validity informs the manipulation of variables to achieve adequate isolation of the dependant variable (Mayan, 2009). In qualitative inquiry, validity implies that the descriptions of a phenomenon are accurately represented by the data (Mayan, 2009). Generalisability or transferability replaces the term of external validity in quantitative research. In qualitative research the transferability assesses the applicability of the findings to other similar settings (Mayan 2009). Transferability was obtained through an adequate and random sample in quantitative inquiry as well through rich and thick description of participants (Mayan, 2009). In the context of qualitative inquiry methods such as selecting interviewees with a wide variety of experiences and opinions improve transferability (Mayan, 2009). Lastly, reliability is concerned with the replicability of the study and its data outcomes (Mayan, 2009). The following paragraph will go into detail about the different techniques used to implement rigor in this study.

Validity and generalisability/transferability are promoted through the quality of the chosen sample (Tuckett, 2005). The sample must include participants who can speak to the topic and provide sufficient data to enable an in-depth description of the phenomenon (Morse et al., 2002). To ensure this, *purposeful sampling* was used to make up the panel (Lincoln & Guba, 1985; Tuckett, 2005). This fostered a panel of criteria selected experts from a variety of
disciplines and geographic locations. “Thick” and “rich” data descriptions were used in this project to promote generalisability/transferability (Lincoln & Guba, 1985). Rich description in the data then lent itself to supporting the results by providing quotes to support the themes.

Adding to the rigor of this study by way of improving reliability and validly, processes of peer review and auditing were utilised (Lincoln & Guba, 1985). Peer review involved engaging supervisors and professionals external to the project to review and discuss the process of working with the data and provide insight and questions about data analysis (Lincoln & Guba, 1985; Mayan, 2009; Tuckett, 2005). An audit trail was also used to help in determining how, when and why decisions were made about the data. This process was supported by the use of NVivo10 (Mayan, 2009; Lincoln & Guba, 1985). Lastly, using a tape recorder to store all of the interviews contributed to this study’s reliability and validity. From the audio recording, detailed care was taken to transcribe each interview verbatim further adding to the rigor of this study (Lincoln & Guba, 1985; Tuckett, 2005).

Researcher responsiveness pertained to the researcher being “creative, sensitive, flexible and skilful”, as well as open to the data outcomes and leaving aside their personal opinion (Morse, 2002). Using this technique helped to ensure validity of the data given that it allowed for the data to hold true to what had been reported by the experts. To confirm that validity was further maintained within the project, methodological coherence was another verification technique utilised (Morse et al., 2002). Methodological coherence aimed to ensure congruence between theoretical perspectives, the methods chosen and the research question (Mayan, 2009). The researcher used a personal journal to log the data collection and analysis to help improve aspects of validity. Member checking, to gain feedback on various aspects of the study, was used to help improve rigor (Guba & Lincoln, 1985).
Collecting and analyzing data concurrently was another technique necessary to achieve rigor (Morse et al., 2002). The data in this project was transcribed and analysed by the researcher as the interviews took place over the period of a few months. This gave the researcher the ability to understand the flow of the data, learning about unique and untold aspects of the phenomenon, and to modify and refine data collection as necessary (Mayan, 2009). For example, upon review, the interview guide was modified to eliminate the probe concerning the difference between exercise prescription for males and female.

Lastly, to ensure validity in qualitative research is to think theoretically (Morse et al., 2002). This implies that a researcher did not leap to conclusions without spending adequate time analysing the data (Mayan, 2009). The data analysis in this project was conducted over a number of months. During this time, the data was revised by the researcher and the participants, and left an extended amount of time for the data to be analysed and understood. Rigor, and the methods that were used to promote it within the context of this project, ensured that the results of this project met the validity, reliability and generalisability requirements of rigorous research.
CHAPTER FOUR-RESULTS

4.1 Sample Description

The sample included 13 experts from both clinical and research fields employed in a number of settings, including hospitals, universities and private practice clinics. One expert panel member did not complete the demographics form, thus the following represents the responses of 12 of the 13 panel members. The mean age of the sample was 46.5 years (standard deviation [SD]=13.23 years) and 75% of the sample was female. Together, the members of the expert panel have worked in the field of EDs for a mean of 15.13 years (SD=9.59 years). The most common ED treated or researched by the panel was EDNOS (or OSFED) (33.4%), followed by combinations of each AN, BN, EDNOS (or OSFED) (16.7%) and AN, BN, EDNOS (or OSFED), BED (16.7%). The majority (50%) of the panel currently incorporated some form of physical activity into their patient’s treatment. Table 1 provides further details of demographic characteristics.

Table 1
*Individual Participant Characteristic as a Percentage and Number of the Sample*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Participant %, (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
</tr>
<tr>
<td>25-34</td>
<td>16.7 (2)</td>
</tr>
<tr>
<td>35-44</td>
<td>41.7 (5)</td>
</tr>
<tr>
<td>45-54</td>
<td>8.3 (1)</td>
</tr>
<tr>
<td>55-64</td>
<td>16.7 (2)</td>
</tr>
<tr>
<td>65+</td>
<td>16.7 (2)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>25 (3)</td>
</tr>
<tr>
<td>Female</td>
<td>75 (9)</td>
</tr>
</tbody>
</table>
Table 1

*Individual Participant Characteristics as a Percentage and Number of the Sample*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Participant %, (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Profession</strong></td>
<td></td>
</tr>
<tr>
<td>Researcher/ Academic</td>
<td>41.7 (5)</td>
</tr>
<tr>
<td>Nurse</td>
<td>8.3 (1)</td>
</tr>
<tr>
<td>Psychologist</td>
<td>8.3 (1)</td>
</tr>
<tr>
<td>Occupational Therapist</td>
<td>8.3 (1)</td>
</tr>
<tr>
<td>Dietitian</td>
<td>8.3 (2)</td>
</tr>
<tr>
<td>Psychiatrist</td>
<td>8.3 (1)</td>
</tr>
<tr>
<td>Other/ Combination</td>
<td>16.7 (1)</td>
</tr>
<tr>
<td><strong>Work Setting</strong></td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td>25 (3)</td>
</tr>
<tr>
<td>Research Setting</td>
<td>33.3 (4)</td>
</tr>
<tr>
<td>Private Practice</td>
<td>25 (3)</td>
</tr>
<tr>
<td>Other (Combination)</td>
<td>16.7 (2)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
</tr>
<tr>
<td>Undergraduate Degree</td>
<td>16.7 (2)</td>
</tr>
<tr>
<td>Graduate Degree</td>
<td>25 (3)</td>
</tr>
<tr>
<td>Doctoral Degree</td>
<td>58.3 (7)</td>
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<tr>
<td><strong>Years in Field</strong></td>
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<tr>
<td>0-5</td>
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<tr>
<td>6-11</td>
<td>16.7 (2)</td>
</tr>
<tr>
<td>12-17</td>
<td>16.7 (2)</td>
</tr>
<tr>
<td>18-23</td>
<td>8.3 (1)</td>
</tr>
<tr>
<td>24-29</td>
<td>16.7 (2)</td>
</tr>
<tr>
<td>30+</td>
<td>8.3 (1)</td>
</tr>
<tr>
<td><strong>Patients Treated/ Year</strong></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>33.3 (4)</td>
</tr>
<tr>
<td>1-21</td>
<td>16.7 (2)</td>
</tr>
<tr>
<td>22-42</td>
<td>8.3 (1)</td>
</tr>
<tr>
<td>43-53</td>
<td>8.3 (1)</td>
</tr>
<tr>
<td>54-64</td>
<td>0</td>
</tr>
<tr>
<td>65+</td>
<td>25 (3)</td>
</tr>
<tr>
<td><strong>Treated ED</strong></td>
<td></td>
</tr>
<tr>
<td>AN</td>
<td>8.3 (1)</td>
</tr>
<tr>
<td>EDNOS (OSFED)</td>
<td>33.3 (4)</td>
</tr>
<tr>
<td>AN/BN</td>
<td>8.3 (1)</td>
</tr>
<tr>
<td>AN/BN/EDNOS (OSFED)</td>
<td>16.7 (2)</td>
</tr>
<tr>
<td>AN/BN/EDNOS (OSFED)/BED</td>
<td>16.7 (2)</td>
</tr>
<tr>
<td><strong>Use of Exercise In Treatment</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>50(6)</td>
</tr>
<tr>
<td>No</td>
<td>33.3 (4)</td>
</tr>
</tbody>
</table>
4.2 Preface

The data from the current study revealed that exercise plays an interrelated, complex role in the treatment and management of EDs. Participants reported that outside of recommending abstinence, the topic of exercise goes ‘mainly untouched’ during treatment. However, the panel reported that there is increased importance being placed on exercise in EDs and an ‘unofficial’ role of exercise is emerging in clinical treatment settings. Changing the role of exercise in treatment of EDs has sparked tension among health professionals due to the negative way some health professionals view exercise in relation to EDs. Much of these negative views were a reflection of a lack of knowledge about exercise, its relationship to EDs and an underlying fear that exercise could be harmful to a patient’s life. It is this lack of knowledge and fear that has resulted in the different views and understanding of exercise between the clinical and research fields of EDs. Despite the negative and differing views of exercise, the panel unanimously agreed that exercise should play a role in the treatment of EDs. Barriers to utilisation of exercise in ED treatment were distinguished into two categories, attitudinal (e.g., negative attitudes about exercise based on exercise abuse) and practical barriers (e.g., funding, space, staff). Lastly, the panel provided some guiding recommendations for introducing an exercise protocol in ED treatment, paying particular attention to different types or modalities (i.e., flexibility, resistance training and cardiovascular activities) of exercise and the environment in which it is undertaken.

Through thematic analysis of verbatim transcripts, four overarching themes were identified and explored. Within each of these themes a number of subthemes were identified, adding richness to the data. These themes and sub-themes are further supported by direct quotes.
offered by experts from the panel. These themes include, 1) *Understanding the Current State* 2) *Gaining Perspectives* 3) *Barriers and Benefits*, and 4) *One Size Does Not Fit All*.

### 4.3 Understanding the Current State

In treatment, the dominant ideology is to restrict a patient’s activity during their treatment. Despite this ideology, the panel reported a shift in the trends and mindset of health professionals about managing patient’s exercise in this manner. This theme presents these ideas among the subthemes “Abstinence or Utilisation: The Controversy” and “The Presence of Change”.

#### 4.3.1 Abstinence or utilisation: The controversy

The panel reported that patient’s exercise habits and behaviours are an aspect of treatment left relatively “untouched” (Hospital Clinician #4) in current treatment protocol. University Researcher #1 explained that the dominant outlook is “if you have any eating disorder we need to limit your physical activity”. Consistently, all panel members agreed that abstinence from exercise was commonly encouraged and exercise was not part of the treatment of EDs in North America.

When asked about changing treatment protocols to formally include exercise programs, the panel indicated that the idea is often met with feelings of tension and apprehension amongst health professionals. They explained that these feelings are due to the way many health professionals understand the relationship between exercise and EDs and the perception that it can be detrimental for patients. Participants had similar responses, including:

> Historically, it was viewed that exercise would cause menstrual dysfunction [in ED patients]. And it’s also viewed that anorexics would use exercise as a form of purging. And so they [health professionals] see it in the equation and circle of the disorder that
it’s the exercise that is causing the disorder by virtue of some kind of underlying compulsion (University Researcher #6).

And, 

In medical writings from the 1940-50 through the later half of the last century, all of the doctors and researchers had a very negative view towards exercise ... because they see it as something that is part of the disease itself (University Researcher #5).

As a result of the historical understanding of the relationship between exercise and EDs, the panel commented that further tensions are present due to the differing views between health professionals, “... the more old guard or old school psychiatry way of thinking about AN and EDs [in relationship to exercise] ... with sorta new contemporary ideas” (University Researcher #5).

Additional hesitation and conflict around this topic was explained by the commonality of exercise abuse (i.e., purging mechanism) present among patients. “There are a number of the [ED] patients that come to us, where compulsive exercise behaviours have become very much a part of the eating disorder complex” (Hospital Clinician #1). The commonality and complexity of unhealthy exercise practises among patients and the treatment team’s reported concern about its negative effects on a patient’s prognosis maintains “fear that it [exercise] will, will worsen the condition” (Hospital Researcher #3) and “could be reinforcing the eating disorder” (Private Clinician #3). University Researcher #2 provided details similar to the thoughts of the panel;

They [health professionals] worry that patients are going to then [after being allowed some activity] go and exercise even more. So they [health professionals] are worried that their patients are basically going to be inadvertently starting a downward spiral that will ultimately lead to death (University Researcher #2).
They further described that many health professionals working in EDs lacked knowledge about the benefits that a safe and appropriate exercise prescription could provide their patients. Together the reasons outlined above are reported to result in many health professionals being “set in their ways” (Private Clinician #1), resulting in the continued recommendation of abstinence from exercise in ED treatment.

4.3.2 The presence of change. Abstinence from exercise was reported as the dominant protocol in addressing exercise behaviours in the treatment of EDs. Despite these initial thoughts, the panel identified exercise in ED treatment as a recent phenomenon and acknowledged that it was becoming more prominent within the field; “Things evolve constantly and I think exercise and activity is one that you know is starting to be on peoples’ horizons” (Olivia, Female Hospital Clinician #2). Some of the panel members disclosed that exercise played an “unofficial role” in treatment and occurred ad hoc depending on individual circumstances, “There is no provision of exercise per se as part of the treatment. We have particular prescribed hours per week of activity and at times we will have yoga as part of our prescribed treatment” (Hospital Clinician #1). Beyond this, other panel members reported that many had intentions of incorporating various forms of exercise in the treatment of their patients. As one panel member explained, “The intention of professionals now is to have it [exercise] as part of their treatment and I just don’t think the intention has caught up with the resources yet” (Hospital Clinician #3).

Although many of the experts alluded to a promising future for incorporating exercise into ED treatment, the practice of abstaining and/or restricting exercise in treatment was still predominant. Much of these thoughts are a result of the tensions and concerns surrounding the perceived negative effects of inappropriate exercise behaviours. Theme two provides some
context as to why these tensions and concerns may exit, suggesting that this is underlined by a lack of knowledge, fear and the different perspectives between professionals.

4.4 Gaining Perspectives

The panel unanimously agreed on the need to incorporate exercise into the treatment of EDs. Despite this agreement, a prominent lack of knowledge was evident about the role and implications of exercise for patients with EDs. As a result, the panel described that there exists significant fear and concern about prescribing exercise to patients with EDs. Together, these two factors lead to differing views and understandings among clinical and research experts with respect to exercise in the treatment of EDs. These results are explored under the subthemes; “A Lack of Knowledge”, “Fear of the Unknown” and “Professional Differences”.

4.4.1 A lack of knowledge. As described by the majority of panel members, “[A] lack of knowledge, including the relationship between exercise and eating disorders, and lack of knowledge around fitness per say” (Private Clinician #3) is predominant in the field of EDs and greatly impacts health professional’s decision to utilise exercise as a treatment method for EDs. The lack of knowledge was expressed to be a result of a scarcity of evidenced-based information and resources available to inform exercise programs for EDs. Specifically, they highlighted that “there is no evidence based [protocol]” (Hospital Clinician #3) for clinicians to follow and inform clinical decisions. Adding to the lack of knowledge present among health professionals, the variety and complexity of abusive exercise behaviour (i.e., excessive exercise and hyperactivity) that emerges in patients with EDs was expressed to add significant complications to managing and addressing exercise abuse in patients with EDs. Panel members were uncertain about how these displays of exercise abuse should be managed and rehabilitated or what healthy
exercise consisted of for patients with EDs. The following explains some of the concern felt by many;

*People don’t really know how to talk about it [exercise] or how to incorporate it in treatment, but also how to talk about it as a symptom. Like we kinda always say its pretty clear even to the general population that if you purge or if you threw up everything you eat there’s not many people who would be like that’s a grey area if that’s healthy or not... but if I run you know 15K a day for example, its grey* (Hospital Clinician #2).

This ‘grey’ area, where health professionals are still not clear of the balance between abusive exercise and healthy exercise for patients with EDs, further influences the hesitancy in prescribing exercise in treatment.

The panel also explained that uncertainty exists about identifying the point in a patient’s treatment when exercise and activity is safe to be resumed. The diversity within the panel’s responses suggested that identifying the optimal point for a patient to resume activity is not consistent across treatment units and/or patients. The panel outlined particular health markers that should be considered when deciding the appropriate time to incorporate exercise into a patient’s life, including BMI, weight (lb/kg), weight as a percentage of estimated minimum natural body weight and body composition. Hospital Clinician #1 explained, “Before about 90% of renourishment, no specific time, it has more to do with where they [patient] are health wise, with their renourishment and physical health and to some extent where their thinking is at”.

Further, within these evaluation parameters no consistency exists to identify the specific weight, percent of estimated minimum natural body weight or adiposity level that was ideal for safely resuming activity during a patient’s recovery. The panel went on to explain why resuming activity during a patient’s treatment is currently based on markers of weight “We don’t have
sufficient knowledge in prescribing, in allowing it [exercise] to return at earlier weights ... so it has been based on non-evidence based approaches” (Hospital Clinician #1).

The inconsistent methods used to evaluate health, and in turn to assess the time point to resume exercise via weight, led other panel members to conclude that information and standard protocols do not exist to address this area of treatment. Private Clinician #3 described, “it’s really conjectured to say that somebody at 80% standard body weight should only being doing light stretching, but on what basis can anybody say that? There aren’t any empirical results that you can base that on”.

The lack of knowledge about exercise was explained to be partly due to the scarcity of exercise specialists (e.g., kinesiologists, exercise researchers, physical therapists) on research teams or informing clinical ED treatment. The following resonated with many of the expert’s comments concerning this lack of expertise;

*We see a lot of researchers who are either medical doctors or psychologists or dietitians and they do not have the complexity of physical activity behaviour captured correctly ... they call it strength training, it’s not strength training. It’s actually extremely low loading ... we wouldn’t expect it to have an effect in anyone* (Hospital Researcher #3).

Moreover, the lack of exercise expertise among the current treatment team members leads to hesitation to implement any formal prescription or management of exercise. University Researcher #2 indicated, “What’s somebody to do [about prescribing exercise] if there is no exercise physiologist on staff, right? They don’t have the training right?”. Due to the lack of training and expertise, many panel members indicated they felt uncomfortable prescribing, managing or even talking about exercise with their patients during treatment. This was emphasised by an expert, who stated “I just didn’t feel comfortable with it
[prescribing/managing exercise] because there is such variance in what people do ... my training and expertise wouldn’t be into how to prescribe exercise for our patients” (Hospital Clinician #4). Thus, this left some panel members unwilling to “dip their toe in” (Hospital Clinician #4) this area of a patient’s treatment.

4.4.2 Fear of the unknown. A feeling of angst about the extent to which exercise may cause a patient to “regress [in] their treatment” (Private Clinician #3) was common among many of the experts. Furthermore, experts felt that future damage could ensue based on how patients interpret what is being communicated in terms of exercise prescription. University Researcher #1 questioned this communication exchange; “Are they understanding what we are prescribing?” further highlighting that if they do not fully understand the message, there is a fear of “overdoing it [exercise]” or “taking it [exercise] to an extreme” (University Researcher #1).

The panel feared that the protocols could “trigger” (Hospital Clinician #3) pathological ED thoughts, and lead to compulsive or excessive exercise and/or re-introduce addiction to exercise. Hospital Clinician #3, added that when she had previously implemented exercise she found that some of her patient’s simply “wonder[ed] if I’m going to burn calories today”. This was supported by many of the other experts, who commonly indicated that prescribed exercise could be “reinforcing participation in a behaviour that was part of the eating disorder configuration” (Hospital Clinician #1) and highlighted that “if the exercise is reinforcing compulsion tendencies, then you are not assisting the individual” (Private Clinician #2).

The panel also conveyed fear of reinforcing compulsive exercise tendencies and pathological ED thoughts through the use of fitness technologies (i.e., Fit Bits). The majority stated “Generally speaking I would be against it [use of Fit Bit] ... [the] devices only serve to measure um, and to monitor versus to normalise” (Hospital Clinician #4). The act of monitoring
is believed to amplify pathological ED thoughts, thus these devices might cause patients to be “obsessed with counting and measurement” (University Researcher #4) or “can lead them into the extreme focus [of counting / measuring] again” (Hospital Researcher #3). One panel member, who had patients that used fitness monitors throughout treatment, reported higher rates of relapse and warned, “the client is engaged in another form of measuring rather than learning how to trust their own anatomy and physiology and achievements through natural measurement” (Private Clinician #2). Overall, the use of these monitors is discouraged for patients with EDs due to their potential to result in pathological thoughts and compulsive behaviours.

Additionally, the panel feared patients would be unable to meet added nutritional requirements for exercise if it was formally included in treatment. They were sceptical about prescribed exercise due to the risk of impeding nutrition and weight recovery. This raised further fears concerning subsequent damage and injury to patient’s physical health. For instance, due to the fragility of the patient’s skeletal system, the panel was concerned about the increased risk of bone fractures and subsequent injuries. In addition, the panel expressed worry about the influence of exercise on a patient’s electrolyte instabilities and the compromised cardiovascular system. The panel worried that exercise may aggravate “[A] mal nourished myocardium” (Hospital Clinician #1) and increase the patient’s risk of a cardiac event and future cardiac complications.

4.4.3 Professional differences. Distinct differences between clinicians and researchers emerged about how exercise in EDs is viewed, understood and discussed within their respective fields. Those working in a clinical setting approached this topic with hesitation and verbalised the dilemmas of managing exercise as a symptom of an ED, while experts from a research setting, although still cautious, were supportive of integrating exercise into ED treatment.
Within the clinical setting, hesitancy, apprehension and uncertainty underlined many clinicians’ responses when asked about their understanding of exercise and the prescription of exercise in EDs. The overall feeling towards exercise in patients with EDs was represented by the following “Its sorta an interesting and taboo area of treatment like I find its not black or white certainly” (Hospital Clinician #2). Moreover, clinician’s first thoughts about exercise centred around exercise abuse, rather than a form of effective treatment, partly because most of their knowledge about exercise was anecdotal and concentrated on dealing with exercise abuse or excessive exercise. They felt that they did not understand enough about it, nor were they able to “tackle it” (Hospital Clinician #3) during treatment as the field “isn’t quite there yet” (Hospital Clinician #3) in terms of its capacity (i.e. number of staff, program development) to incorporate exercise into treatment.

In comparison, researchers had a more confident view that exercise could be utilised as a complementary method to ED treatments. They demonstrated a more complete and detailed understanding of the benefits of exercise for patients with ED. In part, this was due to their independant research programs that specifically focused on exercise for patients with EDs. One researcher described the outcomes of an intervention study that compared a resistance training program in patients with AN with a control group. The researcher noted that the patients with AN saw themselves “be[ing] toned and then they started to feel toned, they were showing off, really they were showing off. Look at my bicep, look at my leg, you know? They were and that’s awesome” (University Researcher #5). These types of positive outcomes and other observed benefits were shared by many of the researchers, all of whom indicated that these positive results have played an influential role in progressing the research field. University Researcher #2 described specific research currently being explored concerning exercise in patients with EDs,
including topics such as, “affect regulation ... were also looking at habit formation... and brain changes” (University Researcher #2). Despite the advancements in research focused on exercise for patients with EDs, these research experts still recognised they also lacked knowledge about the topic and that more research is required.

The gap between the health professionals was also observed by the different terminology used by experts when discussing exercise or activity in the context of EDs. A term commonly used within both the clinical and research health professionals was “physical activity” as this implied being active, but with less emphasis on formal exercise. However, when researchers used terms to discuss exercise in the context of patients with an ED, they used terms including “weight training protocol” (University Researcher #5), “exercise” (Hospital Researcher #3), “therapeutic exercise” (University Researcher #2). While clinical health professionals described exercise as “joyful movement and activity as opposed to the connotations of you know, fitness and exercise” (Private Clinician #1), “fun games” (Hospital Clinician #3) and “activity or leisure fun based activity” (Hospital Clinician #1). Clinicians explained that choosing these terms to discuss exercise with their patients was an attempt to reframe exercise as a ‘fun’ activity. They hoped that this would help adjust their patient’s pathological thoughts about exercise and begin to renormalise it as a healthy behaviour.

The theme “Gaining Perspectives” explored the disparities and inconsistencies surrounding the notion of exercise as a treatment method for EDs. At the root of the gap, is the lack of exercise knowledge, fears about the effects of exercise on ED patients and the differing views between health professionals working in the ED field. These concerns are impacted by the barriers and benefits associated with incorporating exercise in ED treatment. The following theme will provide a greater description of these barriers and benefits.
4.5 Barriers & Benefits

Members from the panel outlined barriers they felt were associated with incorporating exercise into treatment of EDs. Two distinctive categories of barriers emerged through discussion, these included attitudinal barriers and practical barriers. Despite these barriers, the panel also described a number of benefits associated with incorporating exercise into the treatment of patients with EDs. The theme “Barriers & Benefits” is explored in three subthemes “Prevailing Attitudes and Perceptions”, “Practical Barriers” and “Benefits”.

4.5.1 Prevailing attitudes and perceptions. The predominantly negative attitudes and perceptions held by health professionals about incorporating exercise for patients with an ED was a commonly cited barrier.

_The biggest one [barrier] I see is just the negative attitudes of the clinical team, yeah ... clinical leaders like doctors or medical doctors are the ones that run the eating disorder program, and they continue to display, you know, a sense of negativity or over cautiousness, that's going to shape the attitudes and beliefs of the team members right. And they’re not goanna create jobs for an activity specialist to come in and work with the population_ (University Researcher #4).

Many also described that if members of the team, particularly those in a leadership role, did not “buy in” (Private Clinician #1) to the “new and emerging field” (Private Clinician #2) it may result in the treatment team adopting a similar negative view towards incorporating exercise into ED treatment. Unfavourable attitudes were also found to be deterring the dissemination of research findings and undertaking of new research, further contributing to the lack of knowledge concerning exercise and EDs. One panel member described the recent obstacle he faced when trying to publish his research findings, this was indicative of many of the responses.
All we did was put an Actigraph on some girls with anorexia, we didn’t even do an intervention, just put an Actigraph on them to measure their physical activity amount and reviewer number two wrote a one sentence review and just said you’re going to kill somebody and that was their entre review (University Researcher #2).

The idea of incorporating exercise programs may also be met with “resistance to doing something new and different” (University Researcher #4) “even when in the face of evidence” (Hospital Clinician #1). Without the “buy in” from other team members the exercise program may go unwelcomed and will not be fully supported. The panel alluded to a connection between the resistance to ‘buy in’ from team members and their lack of knowledge (as previously outlined above) regarding the benefits of utilising exercise for patients with EDs. Private Clinician #3 explained, “I think some of the biggest largest barriers are lack of information and lack of education for current staff”. Without accurate and consistent information available to help inform new opinions and develop safe and appropriate programs and protocols, the panel indicated that incorporating exercise in ED treatment would be a challenge. In addition to negative attitudes, panel members also outlined many practical challenges they had previously faced, or believed could be a challenge, when incorporating exercise as part of ED treatment.

4.5.2 Practical barriers. One of the most important and influential barriers commonly reported by the panel was “funding” (Hospital Clinician #4). Lack of funding in many facilities limits the ability to hire competent staff to implement, facilitate and monitor the patient’s exercise program. The following highlighted this concern;

An under-funded health care system means we don’t have the money for [exercise] programs, means we don’t have money to hire people, and we are kinda working with kind of like a bare bones minimum type of staff (University Researcher #4).
Without funding for the proper staff, professionals were concerned about the overall logistics of incorporating such a program into treatment. They wondered “how to implement the changes” (Hospital Clinician #4), or “Do they [the unit] have somebody on staff who is willing to work with them [the patients]?” (University Researcher #1) on designing and implementing the program. They worried about “Who [inpatient/outpatient] would be invited to come to the group?” (Private Clinician #3) and how to best include patients at different stages of treatment. They also worried about the challenge of monitoring if patients are appropriately engaging in their prescribed protocols, as outlined in this typical response shared by many,

Then there will be challenges with respect to monitoring these behaviours, their prescriptive behaviours let’s call them, to make sure that they are practised in the way they are prescribed, but I guess that is no different than medication (Hospital Clinician #1).

A lack of ED professionals with expertise in exercise was a consistently identified as a barrier. The following resonates with many of the panels concerns;

When people don’t have an exercise physiologist or kinesiologist on staff the practical barriers of training people and not having them have the right understanding and knowledge base with exercise is certainly a barrier (Private Clinician #3).

Additionally, the panel indicated that teams do not have exercise expertise to refer patients to. The scarcity of exercise professionals with the appropriate training and understanding of EDs influenced the desire and comfort level of clinicians to prescribe exercise to their patients. Thus, the lack of exercise specialists (e.g., kinesiologists, certified personal trainers and exercise physiologists) with an understanding of exercise in EDs, presented a barrier to incorporating exercise into ED treatment.
Having access to an appropriate environment in which to exercise was outlined by the panel as a barrier to including exercise programs into both inpatients’ and outpatients’ treatment. From a public care standpoint, the availability of a hospital based gym or exercise space, and equipment within this space was identified as a concern for program implementation. Regarding the outpatient population, the experts outlined a concern about the patients having the financial means to access a gym or exercise classes. The panel expressed the following concerns, “Do they have the right facilities? Do they have the right equipment? If it’s somebody who is an outpatient, do they have the means to join a gym or fitness facility?” (University Researcher #1). The ‘right’ or ‘appropriate’ facilities were terms often used to describe the choice of gyms or exercise classes for patients. The panel were particularly concerned about the influence that the environment and culture of the facility could have on a patient. For instance, many gyms or centres often centre on competition and have a body image focused culture. This can act as a barrier to facilitating appropriate, safe exercise programs for patients with EDs. The panel cautioned that specialists within ED treatment must be mindful and aware of these cultures and address them accordingly with their patients.

In light of the barriers surrounding exercise as a treatment for EDs, the panel did acknowledge that there are a number of potential benefits to exercise for this particular population.

4.5.3 Benefits. The panel described both psychological and physical benefits associated with exercise for patients with an ED. A main psychological benefit reported was improvements in patient’s distorted thoughts about their body image. This was a vital benefit as “Food intake and body image are the two hardest things for clients to adjust to [during treatment]” (Private Clinician #2). Reconnecting a patient with their body was further emphasised as beneficial
because patients are often disassociated with their body and exercise could help them “be more embodied and be more comfortable with the body and what’s going on [with their body’s while refeeding]” (Private Clinician #3). Further, exercise was described as beneficial due the potential for it to be “empowering, build skills and confidence” for patients (Private Clinician #2) and improve “self-esteem” (University Researcher #6). The panel indicated that improved body image and self-esteem, may help patients “accept the weight gain in a different way and [in a] much better way” (University Researcher #5). ‘Accepting the weight gain’ was postulated to improve compliance with meal plans, another benefit highlighted by many of the panel members.

Moreover, the panel found that exercise “brought out joy and laughter” (Hospital Researcher #1) and helped patients create “mental shifts … [in that] they can feel themselves being calmer” (Private Clinician #2). These benefits were related to an improved capacity to relax and improve/regulate mood. The panel stated that “educating people … giving them increased knowledge” (Private Clinician #3) about exercise was a benefit. The panel further highlighted that the experience of engaging in activity during treatment would provide additional benefits due to the provision of “knowledge [about exercise] [with] a hands on component to it” (Private Clinician #3). By providing education and experiences of healthy exercise, the panel hoped it would foster insight into “the complexity of physical activity, and how they [patients] have abused it” (Hospital Researcher #1). These experiences were proposed to be “an introduction into doing fun physical activity that hopefully becomes a habit” (Hospital Clinician #3) for the patients outside of the context of treatment.

The panel felt that incorporating exercise would help in “making it [exercise] a non-taboo topic and sort of renormalizing it” (University Researcher #4). Private Clinician #3 found that when he incorporated exercise into the treatment of his patients, “there was a lot of trust
developed” and this fostered an “openness [about exercise habits]” between him and his patients. The trust fostered between the patient and clinician through the incorporation of exercise in treatment was suggested to “remove[s] some of the lying and deception that happens” (University Researcher #4) about engaging in exercise. The panel explained that patients often felt guilt and shame when they inappropriately engaged in exercise, however, if exercise was appropriately incorporated into treatment it may decrease the “shame aspect” (Private Clinician #1). It may allow patients to “feel like the medical team is on their side and they are supporting the individual and their recovery rather than instilling shame and fear in the individual” (Private Clinician #2). This would further serve to benefit “their [the patient’s] relationship with the staff” (Hospital Clinician #4) and improve the clinical and patient relationship.

In addition to the psychological benefits of exercise for those with an ED, the panel identified a number of physical benefits. Consistently the panel stressed that exercise can help to improve “bone mass” and “osteopenia in patients” (Hospital Clinician #2) as well as assist with the recovery of muscle mass, function, tone and strength. University Researcher #4 reported that when she had incorporated resistance training into her patients’ care “The controls [patients] increased their weight by means of fat and the intervention group increased their weight by means of muscle but both of them increased the same amount of weight” benefiting their overall body composition. She explained that this is particularly important for this population given that during and after treatment patients “are loosing physical function” because the “muscle function ... [and] muscle mass is not recovered after treatment” (University Researcher #5).

University Researcher #5 found that patient’s aerobic capacity was ameliorated after an exercise intervention. This panel member explained that the “anaerobic and aerobic ventilatory threshold were improved ... the secondary ventilatory threshold moved closer to what is expected
for a normal person”. The improvement in cardiovascular fitness was mentioned to positively
effect the “health of the heart, strength of the heart, heart rate variability” (University
Researcher #6). Furthermore, specialists among the panel explained that high levels of adiposity
are often noted in patients upon discharge. They explained that these high levels of adiposity
serve as a barrier to blood flow and may be taxing to a weakened myocardium, increasing the
risk of a cardiac event. As a result, the potential for exercise to improve body composition is not
only helpful in improving a patient’s overall health, but can also benefit the cardiovascular
system by “decreasing [the] blood flow limitations [of fat mass]” (University Researcher #6).

The benefits outlined by the panel included a variety of psychological improvements such
as improvement of body image and physical connection, confidence, self-esteem, relaxation, and
joy and laughter. As well, the panel commented that the prescription of exercise may improve
the patient/clinician relationship, which could significantly impact the patients exercise and
eating behaviours. Additionally, a number of physical health benefits were outlined, including
improved bone mass, muscular strength, muscular function and cardiovascular health. With the
number of benefits associated with exercise, the expert panel agreed that incorporating exercise
into ED treatment could have a positive impact for patients if a safe and appropriate protocol was
designed. The following theme provides further details concerning the introduction of a safe and
appropriate exercise protocol for patients with an ED.

4.6 One Size Does Not Fit All

The theme “One Size Does Not Fit All” outlines the panel’s considerations about the
design of an exercise protocol for patients with EDs, paying specific attention to individual
differences, safety and different modalities of exercise (i.e., flexibility, resistance training and
cardiovascular activity). This theme also explores recommended settings and/or environments
that would be most appropriate for exercise participation. This is elaborated through the subthemes, “Overall Design”, “Creating Individual Experiences”, “Examining the Details” and “Environmentally Friendly”.

4.6.1 Overall design. Many panel members noted that exercise should be viewed as a process of “return(ing) exercise to a normal place in their [patient’s] lives” (Private Clinician #3). The panel operationally defined renormalizing as “lets try to help our patient(s) and client(s) move their exercise and activity to being a part of a healthy life style” (Hospital Clinician #1). The following quote reflected the panel’s opinion;

No one is going spend the rest of their life in a hospital. And we want physical activity for someone with an ED or a healthy person that has no eating issues; we want that to be something that they can sustain for life (University Researcher #4).

To foster a renormalizing process, the panel reported that the overall design of an optimal exercise protocol “would have the flexibility in the program to manage people at several different levels [of health]” (Private Clinician #3). The panel referred to a graded or progressive protocol to help maximise patient inclusion and safety. In a graded or progressive protocol each patient would be assigned to a level dependant on his or her state of mental and physical health. The assignment and movement through levels was agreed to be “based [on] mainly physical and nutritional improvement” (Leigh, Male Private Clinician 3#) and when reassessing these factors, health professionals need to take into account “that the client is able, physiologically able to move to that next step ... what is their cognition like? What is their strength like? Just because they [the patient] thinks they can [move up levels], doesn’t necessarily mean they can” (Private Clinician #2).
When discussing the idea of a graded or progressive protocol, panel members also recommended specific modalities (i.e., flexibility, resistance, cardiovascular activity), frequencies and intensities of exercise for patients with EDs. The majority of the panel reported that to begin (at the base level), the protocol would include flexibility exercises such as “some light stretching” and yoga. For example;

*It would begin with light intensity [exercise], and it would probably be just a few times a week and would probably begin with flexibility training, perhaps some mild resistance training and then later on moving onto cardiovascular training* (Hospital Clinician #1).

The middle stages of the protocol could include games and group activities, weight training and lower intensity cardiovascular activities such as walking, hiking, biking and swimming. Activities with longer duration, more complexity, intensity and frequency would be added at each consecutive level. These may include heavier weight lifting, TRX, biking, running, Pilates, and circuit training.

Despite agreeing on a graded or progressive exercise protocol and offering some recommendations, the majority of the panel was inconsistent and vague when asked about the modality and frequency (time/week) of exercise sessions throughout the different levels of the protocol. For example, “You would have to monitor their electrolytes to monitor you know if three days of activity would be too much or should they do one [day]?” (Private Clinician #1). However, many did consistently agree on the intensity of the exercise, recommending that the intensity should move from light (i.e., able to continue a conversation) to moderate (i.e., breathing heavy) or “50-70% one rep [repetition] max” (University Researcher #6) for each exercise modality. The intensity of exercise was an aspect of the program the panel suggested would be based on individual needs; “its really going to depend on where the individual is, how
they are feeling about it” (University Researcher #4). Many highlighted it would also “depend on their fitness levels” (University Researcher #6) and the patient’s personal goals. However, professionals warned, “the intensity has to be enough to help them regain the muscle loss” (University Researcher #5) and promote other health benefits.

The panel suggested that an appropriate end goal for a program would be to aspire to the physical activity guidelines for healthy populations. Specifically, a few of the experts referred to the American College of Sports Medicine (ACSM) recommendation, the following resonated with these responses, “the ACSM recommendations would be an end goal; [the ACSM guidelines] would be on the other end of the spectrum, you know of a normal weight person” (University Researcher #3).

4.6.2 Creating individual experiences. The comment “There is no one size fits all for it.” (University Researcher #3) reflected the importance of individually tailoring protocols to each patient’s health status and goals. Creating exercise protocols that provide the opportunity for patients to enjoy exercise in a manner that is unique to their needs, facilitates safety and promotes individualised health, was viewed as critically important. Private Clinician #2 explained “We have to individually assess what is the need for these patients, what is going to help prevent relapse, what is going to help improve progress”. Furthermore, the panel indicated that the patient’s physical and mental health status, activity goals, and healthy activity preferences must be considered when designing a program.

To prescribe responsibly and uniquely for each patient, assessing elements of their health was important. The panel highlighted five aspects of a patient’s health that should be evaluated prior to incorporating exercise into treatment. They indicated that medical stability or medical clearance by a physician was the most critical element to consider. Elements that should be
reviewed when granting a patient with an ED medical clearance to exercise included: a patient’s blood work, current injuries, cardiac risk, and blood pressure. Secondly, a patient’s weight, or an observation of a progression in weight recovery, was also viewed as an important aspect. The third aspect included a patient’s past and current exercise habits, as well as their exercise goals. This was followed by the fourth aspect, which was described as a patient’s ability to follow a nutritional plan to ensure that he/she is prepared to safely begin and adopt an exercise prescription. The final aspect identified by the panel was the patient’s mental health status, highlighting that patients should be involved in psychotherapy during their participation in prescribed exercise.

Setting exercise goals with a patient was voiced as an important consideration in the development of individualised exercise protocols. The experts highlighted that exercise goals may differ widely across patients. Specifically, some patients may wish to return to competitive sport, while for others meeting healthy fitness goals, developing life long healthy habits and using exercise as an outlet for fun, may be the focus. Yet for others, the goal may be dismantling compulsive or abusive exercise habits and/or exercise addiction. Clearly, understanding the patient’s goals is crucial when tailoring exercise programs.

The last part of the process of creating individual and safe exercise experiences for patients is fostering enjoyment during exercise participation. The activities involved in the protocol really “depends on what that person enjoys ... to tell them that they have to do one specific thing is a mistake” (University Researcher #5). The experts warned, “We don’t want the ED to colour the choice of activities” (University Researcher #4). The suggestion of fostering ‘fun’ during exercise was reflected as an attempt to change a patient’s view of exercise from something compulsive, rigorous and torturous, to a behaviour that is enjoyable, and could lead to
a healthy lifelong habit. University Researcher #2 summed up the thoughts of the expert panel in the following; “If you like it you’re going to do it, so I think finding a mode of exercise that resonates with the individual is the most important”.

Given the many different types or modalities of exercise that are available, panel members indicated that it was also important to consider the mode/s that are most appropriate and meet the needs of the patient. Exercise modalities were briefly discussed above in terms of an overall protocol, however the panel provided much greater details about each of these modalities below.

4.6.3 Examining the details. The experts detailed three main modalities of exercise (i.e., flexibility, resistance training and cardiovascular activities), and discussed how they could be appropriately incorporated into the treatment of EDs.

Flexibility training. Incorporating flexibility training into exercise protocols for patients with an ED was confidently accepted and promoted as safe by the panel. Hospital Clinician #1 suggested “flexibility first” when reincorporating exercise in ED patient’s lives and the panel voiced it can be “done pretty much almost everyday” (University Researcher #1). Many agreed with this due to its low impact and caloric demand. Hospital Clinician #2 suggested that flexibility training has greatest utility when it is paired with “some mindful connection to breathing” and Private Clinician #2 added that flexibility exercise or “body movement exercises involving music” helps patients relax. As part of flexibility training, it was suggested that exercise bands could be incorporated, as well as seated whole body “stretching” or similarly, group yoga classes. However, the panel voiced concern about hot yoga, indicating that it “just sounds dangerous” (University Researcher #6). Concern existed about “people subjecting themselves to that strenuous activity, and heating up the body” (Hospital Clinician #1) and the
resulting “physiological demands” of the heat (University Researcher #3), and their implication for “cardiovascular issues” (University Researcher #5) and “dehydration” (Hospital Clinician #1).

**Resistance training.** The panel noted that they were beginning to understand the utility and benefit of resistance training (RT) for patients with an ED. It was viewed that “the most important [exercise modality] is the strength or resistance training” (University Researcher #5) due to its “lower calorie[s] demand” (University Researcher #5) and its importance in restoring muscle mass and function. It was also viewed to impose lower risk than cardiovascular training because “cardiovascular training is where the abuse happened but very few [patients] did weight training” (Private Clinician #3). There were types of weight training that were promoted to be safer at starting stages of the protocol than others. Specialised experts suggested, “[stationary] machines at least at the beginning” (University Researcher #4) because “the joints and the core” (University Researcher #4) need to be protected at the starting stage to prevent future injury. Other types of RT suggested for patients with an ED were body weight exercises, Pilates, circuit training, as well as the use of RT equipment, such as exercise bands, punching bags, bars, and dumbbells. University Researcher #6 suggested that even “lifting a can of soup” could be useful for improving the health of a very ill patient. A type of RT that was notably discouraged for these patients was CrossFit. The panel felt it was a “risky” activity as a result of its “cult-like mentally” (University Researcher #3) and high possibility for injury.

**Cardiovascular activity.** Cardiovascular activity was approached with the strongest hesitancy and uncertainty by the panel. The panel’s concerns about incorporating cardiovascular activity into a patient’s protocol were driven by the underlying tendency for patients to abuse cardiovascular activity. For instance, Hospital Researcher #3 explained that running is often a
culprit of this, in that “those who do compulsive exercise, they run and run and run and run”. Thus, activities such as running are most often discouraged for much of the recovering ED patient population, particularly in AN. However, the panel also indicated that eliminating the activity all together could “create resistance” (University Researcher #1) from patients, meaning they would be more likely to disengage with staff and with other aspects of their treatment (i.e. psychotherapy). Experts warned if a patient were in an unmonitored setting, they would “do it [cardiovascular activity] anyway” (Private Clinician #3). The panel feared that if the activity was left unaddressed or completely eliminated within a treatment setting, the patient may take up running in a secretive, and unhealthy manner (i.e., excessive running or secretive exercise) outside of the treatment setting.

In light of their concerns with cardiovascular activity, the panel indicated that cardiovascular activities should not be completely banned, “I wouldn’t necessarily say all cardiovascular activity is out” said Hospital Clinician #2. If a patient did have a desire to engage in running as a form of exercise, the panel suggested a close examination of the motivation behind the activity and the personal exercise history of that patient would be necessary before prescribing it as part of the patient’s treatment. Further, they explained that in order to avoid feeding into compulsive exercise habits it might be beneficial to incorporate different types of cardiovascular activity (e.g., nature walks, group relay games, playing sport) and ensure that the patient has had a “break” (Hospital Clinician #3) from the previously abused activity. The panel suggested that if the abused exercise method was running then;

*Not to start running again yet. Because it just triggers the thoughts of calories, so try and find other activities that are going to help them [patients]. Help their mood, but also retrain their brain to accept different forms of exercise that are more social and are not*
With this in mind the panel suggested that cardiovascular activities incorporated into the beginning of a protocol should include “fun activities and adding playful elements” (Hospital Researcher #3) such as “hiking and games” (Hospital Clinician #3) that take place in a group setting. In addition to the different modalities of exercise outlined above, the panel also indicated that the environment in which a patient participates or engages in exercise was critical.

### 4.6.4 Environmentally friendly

The panel discussed that patients an with ED are sensitive to their environment. As such, one of the panel’s reoccurring suggestions was to have patients participate in activities “outdoors, you know whether it’s a bike ride or a hike or a walk or swimming, outdoors would be great” (Private Clinician, #1). They described an outdoor setting as the “ultimate place” (Private Clinician #2) because “nature is mindful, there’s so much that’s healthier [about exercising outdoors] in my eyes” (Hospital clinician #2).

Panel members also shared their thoughts concerning patients with EDs exercising in a gym setting. They explained that this could be a double-edged sword; some of the panel members could “see the usefulness of a gym type set up” (Private Clinician #1) in that is provides the necessary equipment and infrastructure to facilitate therapeutic exercise, however, others felt that this could also be a place where ED thoughts could be triggered in a negative way. Particular concern arose about patients exercising in public gyms due to the fact that “a lot of the physical training world is focused a lot on weight loss, body shape/size” (Hospital Clinician #2) from an aesthetic viewpoint, rather than the physical and mental health benefits. The panel voiced concern about a gym environment triggering pathological ED thoughts. They warned that a gym environment would encourage “competing and comparing” (Private Clinician #1).
#3) of abilities and body types between the patients and others in the gym. They were also worried that patients may be particularly sensitive around “scantly clad individuals” (University Researcher #4), which could result in increased tendencies to self-evaluate and criticise their own bodies via the many mirrors often found in gyms. However, the panel also indicated that exposure to these types of situations could also be positive for patient with EDs. Specifically, exposure to these triggers may benefit patients with an ED in the long term by addressing and challenging the negative EDs thoughts and helping them progress in their treatment. The following explains,

> For some people who really over exercise a lot in the gym, the treatment has to occur in the environment that they are most triggered. Dealing with mirrors, dealing with seeing other people that are dressed where you can see what their body looks like (Private Clinician #3).

As such, it was recommended that the availability of a gym at the hospital, or one that does not promote a body focused gym culture would be most beneficial to facilitating psychotherapy and promoting healthy exercise.

The panel unanimously agreed upon the need for supervision during the beginning stages of an exercise program for inpatients and outpatients. The follow quotation highlights the thoughts of many of the panel members, “inpatients, they are probably going to be more extreme, they have more medical complications and I would think we would want to supervise them the whole time [during a workout] (University Researcher #1). However, the panel also acknowledged that this level of supervision may not always be necessary, “I don’t necessarily think that someone needs to be with them every step of the way ... graded supervision, so not supervision constantly” (Hospital Clinician #4). The idea of a graded supervision protocol was
related to the benefits of fostering independence and long-term healthy habits once treatment is completed. Hospital Researcher #3 explained the importance of fostering independence; “They have to be challenged to do it on their own because when they get home they have to do it on their own”. University Researcher #5 supported this statement and described “There has to be progress to have a normal life right, so at the beginning more [supervision] and so with the time it has to be more of a progression, of them trusting themselves and on and on”.

Furthermore, the panel saw the utility in both group and individual based exercise programs. Activity in a group setting was actively promoted by the panel; “I like the idea of a group activity I think that’s a great idea because having a group dynamic can be a very positive thing” (University Researcher #1). The panel outlined two benefits of group activity, the first being that group activities were “things [activities] that don’t specifically look at numbers and calories lost and all that kind of stuff” (Hospital Clinician #2) and would lead to less compulsive monitoring and/or calorie counting. A second benefit of group activity was its promotion of social interaction. Comments such as “the idea of the group is that it allows for sociability” (Hospital Clinician #1) and “maybe to meet some friends, someone they share an interest with” (Hospital Clinician #2) were indicative of the experts’ responses. Moreover, groups activity was also seen as an opportunity to “bring that up [competing and comparing] with a group, comparing one another’s bodies or abilities and um normalizing that” (Private Clinician #2).

Members of the panel also suggested that “There needs to be an option for both [group and individual exercise]” (University Researcher #2) when designing an exercise protocol for patients with EDs. The ‘one on one’ individual training provides an opportunity to help patients “learn[ing] [body] form” and exercise techniques in an environment where “there’s not that comparison judgment” (Hospital Clinician #2) patients may feel in a group setting. The need for
individual protocols was promoted by the panel as a means of developing a sustainable exercise habit beyond treatment, particularly because it assisted patients with meeting their individual activity goals and fostered individual health benefits.

In sum, the expert panel members provided foundational information concerning an understudied area in the ED field. Specifically, these results provide further context around exercise in ED treatment, highlighting that the historical view of abstinence from exercise is still the dominant ideology when considering exercise in ED treatment. Fear and lack of knowledge were reported as the driving force behind this negative ideology, which was further compounded by differing views between health professionals. The panel also identified attitudinal and practical barriers that influenced the utilisation of exercise in ED treatment. Despite these barriers, the panel highlighted many psychological and physical benefits of exercise for their patients. As a result, a graded exercise protocol that was tailored to each individual patient’s health status, goals and preferences was suggested to foster independence and life long healthy exercise habits.
CHAPTER FIVE-DISCUSSION

The purpose of this study was to explore the opinions and beliefs of ED experts concerning the role of exercise in the treatment of EDs. Through thematic analysis, four major themes were identified, including 1) “The Current State”, 2) “Gaining Perspectives”, 3) “Barriers and Benefits” and 4) “One Size Does Not Fit All”. Together these themes captured the complex and interrelated role of exercise in ED treatment, as described by the panel of experts.

Results from this study explained that exercise goes mainly “untouched” in the treatment of EDs. During treatment, the most common practice used to manage a patient’s exercise and activity behaviours is to recommend abstinence from all activity. These practices are not unique as research suggests the leading approach used to manage activity continues to involve some form of restriction, commonly determined by a weight measurement criterion (Davies et al., 2008; Touyz, Lennerts, Arthur, & Beumont, 1993). The panel described that health professional’s current practices and beliefs are a result of the historical view and understanding of exercise in relation to EDs. These historical beliefs describe patients engaging in exercise as a “pathological calorie wasting mechanism employed to limit energy reserves” (Davis, Kapstein, Kaplan, Olmstead, & Woodside, 1998, p.3). As a result, exercise is viewed by health professionals not only as a means to lose weight, but also as a feature of the illness (Boyd, Abraham, & Luscombe 2007; Bratland-Sanda et al., 2009; Calogero & Pedrotty, 2004; Hausenblas, Cook, & Chittester, 2008; Moola, Gairdner, & Amara, 2013). Confirming this idea, studies have shown that when excessive exercise is combined with dietary restriction and goes unaddressed, it results in medical instability and is a cause of in-hospital treatment (Dalle Grave, Calugi, & Marchesnin, 2008). Moreover, compulsive exercise habits are recognised as a central component to the pathogenesis of EDs and can precede the onset of an ED, act as a maintenance factor and are often one of the last symptoms to subside (Meyer, Taranis, Goodwin, & Haycraft,
In patients with AN, abusive exercise behaviours are one of the strongest predictors of poor treatment outcomes (Dalle Grave et al., 2008). When patients with BN abuse exercise, they experience a higher prevalence of unhealthy bulimic eating attitudes (Dalle Grave et al., 2008). As a result, patients spend longer times in hospital, display a shorter time to relapse and are associated with a higher risk of suicide (Carter, Blackmore Sutandar-Pinnoc, & Woodisde, 2004; Dalle Grave et al., 2008; Meyer et al., 2011). This leads many health professionals to recommend that patients with EDs should not engage in any exercise as it serves as an obstacle to weight replenishment and reinforces ED behaviours (Calogero & Pedrotty, 2004; Davies, 2015; Touyz et al., 1993).

Despite the contemptuous relationship between EDs and exercise abuse, recent research has indicated that recommending abstinence from activity during treatment is a flawed, uninformed manner to manage activity behaviours, and that restricting exercise could actually be more detrimental to a patient’s health (Davies, 2015; Meyer et al., 2011). Specifically, Meyer et al., (2011) found that the amount and intensity of exercise undertaken does not relate to a patient’s drive for thinness. Rather, it can assist with decreasing anxiety and patient’s ‘drive for thinness’, decrease commitment to exercise, provide enjoyment, help with mood and body image, foster self-efficacy and improve the process of refeeding and meal time discomfort (Cook, Hausenblas, Tuccitto, & Giacobbi, 2011; Davies et al., 2008; Ng, Ng, & Wong, 2013; Vancampfort et al., 2014). Moreover, Hausenblas et al., (2008) demonstrated that it is the underlying psychological motivational factors (e.g., anxiety, fear of gaining weight and getting fat) driving the urge to engage in excessive or abusive exercise, and not the act of exercising itself. Patients who are dependant on exercise, such as many individuals with an ED, suffer worse psychological detriment when regular exercise regiments are restricted compared to their
healthy counterparts (Antunes, Terrao, & Tulio de Mello, 2011; Davies, 2015; Dalle Grave et al., 2008; Penas-Lledo, Vaz Leah, & Waller, 2001). In addition, complete or partial restriction of exercise has been described to aggravate symptoms of withdrawal, including increasing feelings of guilt, depression, anxiety and irritability, further complicating treatment efforts (Davies, 2015).

The increased importance and benefits of incorporating exercise into health care is further supported by literature in other health care areas. Specifically, exercise has been shown to play a positive role in the prevention, rehabilitation and treatment of a variety of physical (e.g., cardiovascular disease, diabetes, obesity) and mental health (e.g., schizophrenia, depression and anxiety disorders) illnesses (American College of Sports Medicine [ACSM], 2010; Canadian Society of Exercise Physiology [CSEP], 2010; Exercise is Medicine Canada, 2016; Mampuya, 2012). Most recently this trend has started to gain momentum within the ED field, however due to a lack of knowledge and fear of negative health outcomes, and differing views between health professionals, there is still tension and hesitancy towards officially changing current practice and incorporating exercise into ED treatment (Carei, Fyfe-Johnson, Breuner, & Brown, 2010; Fernandez-del-Valle et al., 2010, 2014; Thien, Thomas, Markins, & Birmingham, 2000; Touyz et al., 1993).

The gap in knowledge between health professionals lies mainly between researchers and clinicians, and is an underlying issue that has been identified throughout mental health care (Garland, Plemmon, & Koontz, 2006). Much of the gap emerging between researchers and clinicians results from researchers relying heavily on experimental based research (i.e., randomised control trials) to inform their thoughts on what is best and most appropriate to recommend for treatment protocols. However, clinicians feel that much of this research and
subsequent recommendations do not consider real world elements that may impact treatment (Garland et al., 2006). For instance, clinical teams experience the burden of the difficult and long process of treatment (particularly for those who are not willing to undergo treatment) and the lengthy wait lists for hospital admission (Needham, 2008). ED treatment is further complicated by the requirements of managing patients at different care levels and the challenges of helping patients deal with the transition between hospital and real world settings, all of which are external to the patient and not often considered when undertaking research (American Academy of Paediatrics, 2003; Needham, 2008). To move forward, further research is necessary to add to the currently limited body of literature and provide a greater understanding of the mechanisms and benefits of healthy exercise for those with an ED (Davies et al., 2008). In addition, this research needs to be accompanied by clinician input regarding the practical, ‘real world’ factors associated with implementation and sustainability.

Working in collaborative partnerships to inform and implement exercise in ED treatment settings may help to bridge the gap between health professionals, particularly those from research and clinical settings. Collaborative teams can benefit the clinical setting by helping exchange information, facilitate the integration of research to practice and reduce disparities in access to quality care (Garland et al., 2006). Research can benefit from the input of clinicians by tailoring their research questions to the needs of both fields (Garland et al., 2006). The joint formulation of research questions and input from clinicians in all decision-making aspects of the research undertaken will help address the realities of a real world setting, provide the infrastructure of a network of clinical professionals and execute a more efficient integration of research to practice (Garland et al., 2006).

Such collaborative efforts have been extremely successful with other disease populations
and is most evident within the field of cardiac rehabilitation. For several years, there was a divide between health professionals as many did not recognise the benefits of exercise for those suffering from cardiovascular disease (CVD) or a CVD event, such as a myocardial infarction (Mampuya, 2012). Patients with CVD were encouraged to rest and not perform anything that would put unneeded strain on the body (Mampuya, 2012). However, as more knowledge (via research and practice) was accumulated about the benefits of exercise for patients with CVD, health professionals began to change their views of exercise for these patients (Mampuya, 2012). More importantly, they began to realise that this was a complex illness and required input from a number of health disciplines to fully understand the physical, mental and emotional benefits associated with exercise in cardiac rehabilitation (Mampuya, 2012). Based on these understandings, cardiac rehabilitation teams went beyond just a researcher and a clinician and included a team made up of physicians, exercise physiologists, nurses, occupational therapists, physical educators, dietitians, psychiatrists or psychologists and social workers, all of whom contribute to different aspects of treatment (Heart & Stroke Foundation, 2015). Given the complex nature of EDs, the lack of knowledge concerning exercise and ED and the current hesitancy to implement it in ED treatment, taking a similar approach to cardiac rehabilitation and utilising multidisciplinary networks of relevant health professionals, would greatly serve the ED field.

Based on the current needs within ED treatment outlined by the expert panel and the limited research literature, a multidisciplinary team is encouraged to include an exercise specialist, such as an exercise physiologist, kinesiologist or physical activity and/or exercise research interventionists that works at a community level and collaboratively with community partners. The addition of an exercise specialist on the clinical team would serve to address many
of the barriers outlined by the panel as well as provide a greater understanding of the role of exercise in ED treatment. The exercise specialist would work closely with the ED clinicians to assist with determining which patients would benefit most from exercise therapy, as well as, play a lead role in designing, delivering and evaluating the exercise protocols (Wattles, 2001; Richardson et al., 2005). This individual would help educate patients about healthy exercise behaviours, particularly promoting a positive relationship between exercise and the body as a whole (Mehler, Winkelman, Andersen, & Gaudiani, 2010; Vanderlinden, Buis, Pieters, & Probst, 2007). This education could be delivered via group exercise sessions in which the specialist would work in conjunction with other health professionals to implement holistic patient treatment, addressing topics such as nutrition, life-style modification, progressive relaxation and stress reduction techniques (Wattles, 2001). An exercise specialist could also educate health professionals, particularly clinicians, to help alleviate their fears and build their confidence to design and prescribe exercise protocols for future patients (Happell, Platania-Phung, & Scott, 2011).

Even though there is value in including an exercise specialist on ED treatment teams, the panel explained that this is often difficult due to limited funding. Again, this may be an opportunity where researchers and clinicians could work together. Wattles (2001) suggested that health professionals with exercise expertise could be helpful when preparing grant proposals to undertake research in mental health. Having clinician teams involved in this process and distributing funds between the institutions-clinics-hospitals would provide exercise researchers with the opportunity to undertake a community based approach and obtain data from real world settings, and also provide clinical teams with exercise expertise and additional funds to subsidise things like exercise equipment or access to exercise facilities or different exercise classes.
(Everett, Dennis, & Ricketts, 2013; Wattles, 2001). Furthermore, having an exercise specialist within the treatment team could also help with extending and sustaining exercise beyond the clinic and hospital as this individual would be able to provide advice about other community programs, local fitness centres, and how to design your own low cost exercise program (Everett, Dennis, & Ricketts, 2013; Wattles, 2001).

In light of the tensions and hesitations felt by health professionals towards incorporating exercise, all panel experts did indicate that exercise is an important element of an ED and that should be incorporated into ED treatment. As such, the panel offered recommendations for designing a safe exercise protocol for patients with EDs. Central to this, was the idea that a protocol must be uniquely tailored for each patient and based on aspects of his or her health status, activity preferences and health and fitness goals, in addition to considering the patient’s ability to progress with their nutrition plan. Tailoring a program to an individual based on these criteria helps to ensure a safe protocol is developed in a client centered manner, decreases the risk of an adverse event and provides patients with the maximum benefits possible (CSEP, 2010; Richardson et al., 2005). For any population, developing individualised exercise protocols is a complex undertaking due to multitude of design components that contribute to their effectiveness (Marcus & Forsyth, 1998; Richardson et al., 2005; Segar, Jayaratne, Hanlon, & Richardson, 2002; Strecher et al., 2002). However, designing protocols that are tailored to an individual’s health status, age, socioeconomic status and considers their own specific barriers to exercise, are more effective then assigning a single protocol to all patients (Marcus & Forsyth, 1998; Segar et al., 2002; Richardson et al., 2005; Strecher et al., 2002). In EDs, tailored programs are of added importance because of the unique role exercise plays in the life of each patient. Furthermore, the increase in the incidence of EDs among a variety of ages, cultures and between males and
females calls for programs that can appeal to a variety of patient needs and preferences. Tailoring protocols to appeal to each patient has the potential to increase program adherence and patient enjoyment, and has been shown to be effective in terms of meeting patient’s exercise goals (Marcus & Forsyth, 1998; Richardson et al., 2005; Segar et al., 2002; Strecher et al., 2002).

When tailoring programs specific for patients with an ED, each individual’s health status should be reviewed prior to engaging in any form of exercise in order to determine if the patient is physically, mentally and emotionally ready to engage in exercise. The results from this study suggested five aspects of health (medical clearance, weight, nutritional status, exercise history/goals, mental health) be closely examined prior to prescribing exercise for patients. Each of these aspects should be considered in reference to a patient’s individual diagnosis (i.e., AN, BN, OSFED) to safely incorporate the most appropriate frequency, intensity and modality of exercise for each diagnosis. For example, patients with AN have a higher prevalence of engaging in exercise abuse, then patients with BN (Hausenblas & Symons Downs, 2002). Therefore the program designed for these patients must be considerate of this factor, by implementing methods of psychotherapy and assuring that a break from the abused activity is allowed prior to its resumption. In order to properly assess each patient’s health status, it is important to conduct a multidisciplinary assessment, inclusive of health professionals that have expertise in assessing particular aspects of EDs. For instance, a physician in crucial in determining medical clearance, however, a physician may not have the ability to speak to a patient’s nutritional progression in reference to exercise, thus a dietitian should also be included in the overall assessment. Furthermore, the addition of a psychologist may assist with understanding the mental health status of a patient, which is also crucial for determining a patient’s readiness to participate in exercise. The patient may be physically ready and receive medical clearance, however they may
be struggling mentally and not able to deal with the added stress of a new treatment. In addition, an exercise specialist may be of added importance due to the importance of evaluating an individual’s health through fitness testing prior to prescribing exercise (CSEP, 2010). McCallum et al. (2006) suggested a fitness assessment is important for patients with EDs due to the cardiac complications frequently present during the acute phase of the illness. Furthermore, an exercise professional can evaluate a patient’s previous exercise history and design a program accordingly (Wattles, 2001).

The next step to tailoring a program for patient with EDs is the consideration of the patient’s particular preferences and goals. If patients are to adhere to an exercise protocol and develop a long-term healthy exercise habit, exercise protocols must be developed with consideration of the patient’s goals and preferences (Dishman, 1994; Hausenblas & Symons-Downs, 2002; Richardson et al., 2005). This is particularly important for patient’s with EDs as these goals may vary drastically depending on health status and previous exercise behaviours (i.e., abusive exercise) (ACSM, 2010; Richardson et al., 2005). Setting goals with their exercise specialist may help them learn about what a healthy exercise goal is and provide them with guidelines they can follow to meet their exercise goals. Setting goals and offering tools to guide patients to meet their goals will help them gain confidence in their exercise knowledge and ability to navigate real world pressures.

Although exercise prescriptions should be tailored to each individual patient, the panel did recommend general components that should make up the core of the protocol and can act as a starting point for program tailoring. As an objective, the protocol is recommended to foster physical and mental health outcomes and ‘renormalise’ exercise to maintain healthy exercise habits beyond treatment. To meet this objective, the protocol should be progressive in nature, in
which patients move to the next level based on their own individual health criteria, as outlined above. Progressive protocols have shown to be successful in previous ED research as they have effectively challenged distorted beliefs about exercise and ultimately helped equip patients with the tools to face the pressures present within a real world setting (Calogero & Pedrotty, 2004; Schlegel et al., 2015; Thien et al., 2000). The success of a progressive protocol may be attributed to its flexibility in including a variety of patients and allowing for changes and variations to be made based on each patient’s health status, preferences, goals and current fitness levels (Calogero & Pedrotty, 2004; Thien et al., 2000). Using progressive levels within the protocol also provides health professionals with the opportunity to monitor patients to ensure that they are consistently engaging in safe, healthy exercise by having the ability to remove or progress patients through levels based on their health status (Calogero & Pedrotty, 2004). If an ED behaviour should re-occur, it was suggested that the patient should be removed from the program until a non-symptomatic behaviour pattern returns (Calogero & Pedrotty, 2004). When the patient becomes non-symptomatic again, they may return to the level that they were removed from or they may regress one or more levels dependant on their physical and mental health status. Again, a tailored approach would be taken in which this would be decided on a patient to patient basis and in consultation with the treatment team and the individual patient.

Within each level of the protocol, flexibility, resistance training and cardiovascular activity were recommended. Flexibility training was a modality of exercise felt to impose the least risk to patients. This modality of activity can be resumed the sooner that other modalities, once hypotension has been resolved (McCallum et al., 2006). Flexibility training is recommended to be present in different frequency, times and types throughout the entire program, and should be incorporated as soon as the patient is able, as it serves to help the
patients relax, move and reconnect with their body (Beumont, Arthur, Russell, & Touyz, 1994; Carei et al., 2010). Patients with EDs have notoriously high levels of anxiety and thus the use of flexibility training, such as a yoga class, helps to create a calm environment and teach new techniques for relaxation (Carei et al., 2010). Moreover, the music that often accompanies a yoga class can further assist patients to relax.

Resistance training (RT) was a second modality of exercise suggested by the panel, however research has indicated that caution should be taken in prescribing RT due to a number of health related factors that could be exacerbated by engaging in RT (McCallum et al., 2006). Despite the concerns, McCallum et al., (2006) suggested that when a patient’s nitrogen levels have been resolved, RT could be included in a patient’s protocol. Furthermore, it has been found that the malnourished body responds to the intensity, frequency and time of RT in the same way as healthy populations (Fernandez-del-Valle et al., 2014; Vancampfort et al., 2014). Knowledge of the body’s response to RT will help determine the frequency, intensity and most beneficial time to prescribe RT to patients with an ED. For instance, research concerning RT for patients with AN has shown that utilising a minimum intensity of 70% of a patient’s one repetition maximum, provided health benefits (Fernandez-del-Valle, 2010; 2014). However, this was a general observation from one study and this will vary in other patients, thus this further supports the notion of a tailored approach when prescribing exercise. In the future it may be of value to determine each patient’s own repetition maximum in order to maximise the health benefits this type of activity can provide.

The last and most complex exercise modality discussed by the panel was cardiovascular activity. Similar to RT, the panel expressed fear of incorporating this activity because cardiovascular activity has previously been known to reinforce ED thoughts and abusive exercise
behaviours (Hausenblas & Symons Downs, 2002). For example, running and biking in solitude have been reported as the most common forms of exercise patients with EDs abuse (Davies et al., 2008; Hausenblas & Symons Downs, 2002). Despite these concerns the panel also suggested that restricting it altogether might create tension between patients and their treatment teams. When the patient/health provider relationship is damaged, it results in lack of trust and a breakdown in communication between patient and the health professional. Patients may no longer disclose important details about their health and current behaviours which could significantly impact patient prognosis as it has been suggested that a good relationship between patient and clinician is one of the most important elements to a successful recovery (Vanderlinden et al., 2007).

To include cardiovascular activity in a safe manner, it may be prudent to spend time educating patients on healthy and unhealthy aspects of exercise behaviours, paying particular attention to activities that may cause concern, such as running (Schlegel et al., 2015). Programs such as the Friedburg Sports Therapy Program for outpatients with an ED who have previously abused exercise, were successful in improving traits of this symptom (i.e., over-commitment to exercise, rigidity and drive for thinness) with a program that included psychoeducation (Schlegel et al., 2015). The psychoeducation program addressed topics such as; reasons for exercise and dysfunctional thoughts and expectations associated with the obsessive-compulsive features of exercising (e.g., exercising alone, strict rules etc.) (Schlegel et al., 2015). The program examined the intensity and duration of exercise and how to detect one’s limits and the importance of making time for relaxation (Schlegel et al., 2015). It went on to address the influence of an achievement oriented outlook on exercise and perfectionism (Schlegel et al., 2015). Lastly, it helped patients explore the positive effects of exercise and urged them to reflect on past experiences (Schlegel et al., 2015). Similar programs should be offered regularly, within clinics
and hospitals, in order to help patients fully understand the benefits, barriers and challenges associated with different modalities of exercise, particularly with modalities that could potentially regress their ED’s progress, such as cardiovascular activity. Moreover, these types of programs may help to bolster a patient’s confidence in their ability to engage in healthy cardiovascular activity and other exercise modalities. A patient’s confidence in their success at engaging in healthy exercise translates to increased self-efficacy, which may be helpful for maintaining these behaviours outside of the treatment setting (Bandura, 2010).

Another core component that must be considered when designing an exercise protocol for patients with an ED is the environment/setting where patients engage in exercise. Of particular importance is the culture promoted within these environments and settings. For example, programs and facilities delivered at some gyms pride themselves on ‘youth development, healthy living and social responsibility’, however there are other facilities, which support competitive, intense environments where body shape and body image are more often the focus. A culture within a gym setting is made up of a variety of elements, the patrons, the layout of the facility, the programs and equipment they offer, even the added luxuries of the facilities such as day care, tanning beds and saunas (Macintosh & Doherty, 2007; Roper & Polasek, 2006; Sawyer, 2002). Facilities who aim to appeal (through the equipment, programs and additional luxuries offered) to individuals who use the gym for body centered exercise will attend gyms centered around these values. Exercisers who emphasises thinness or muscul arity such as non-elite ballet dancers, non-competitive body builders and gymnasium users have a higher degree of body uneasiness and eating disorder attitudes and behaviours when compared to a non-gym attending control group (Ravaldi et al., 2003). Given that patients with EDs have a heightened sense of body image and self from the healthy population, it is important that gyms projecting a culture
focusing on musculature or thinness be avoided due to the repercussion this environment has on its gym attendants. These environments could be detrimental to recovery as they could trigger negative ED thoughts (competing and comparing between bodies and individuals at the gym), and lead to compulsive counting and measuring behaviours (i.e., calorie, step, mile) and ultimately their feared it would trigger worse exercise habits. Ideally for patients with EDs, the environment/setting (i.e., gym or exercise facility) would be within the hospital, and patients would be surrounded with supportive staff that encourages exercise for health and enjoyment purposes rather than focusing on body shape or weight. Duesund & Skarderud (2002) found benefit in framing exercise in a non-body focused manner, specifically, when they framed activity as a manner to ‘use the body, to forget the body’ it provided patients with enjoyment and insights surrounding exercise habits and activities (Duesund & Skarderud, 2003). Once a patient becomes more knowledgeable about healthy exercise within this ‘safe’, controlled setting, it may translate to more successful encounters with triggering situations outside of the treatment setting. As a result, this would help meet the panel’s goal of developing healthy exercise habits in the long term.
CHAPTER SIX—CONCLUSIONS

6.1 Overview

Exercise as a supportive treatment method for EDs is a complex issue that has previously been met with contention from health professionals. More recently, there has been a shift in how health professionals working with patients with EDs view exercise, mainly due to the known benefits associated with engaging in a safe and healthy exercise protocol. However, research in this area is very limited and little is known about how to design a safe and healthy protocol or how to incorporate them into ED treatment. The present study endeavoured to explore these concerns by undertaking semi-structured interviews with an expert panel of health professionals who work with ED patients and/or undertake research in the area of exercise and EDs. These interviews provided rich data concerning the role of exercise in the treatment and management of EDs. Based on this data, and guided by the research literature, four emerging themes were identified. The first theme outlined the current state of the field in terms of incorporating exercise in ED treatment. The panel highlighted the historically negative views surrounding the topic, indicating that those working in the field are hesitant to prescribe exercise for patients with EDs, and thus often abstain from incorporating it into treatment. However, many of the panel members felt that this was beginning to change due to the reported physical, mental and emotional health benefits associated with exercise as a supportive treatment method. Theme two further explored why this hesitancy and abstinence occurred, commonly highlighting that this was due to a lack of knowledge about exercise, a fear that patients would abuse it and that it could further hinder their recovery. The lack of utilising exercise in treatment was reported to be greatly influenced by the divergent views between health professionals, particularly those working within the clinical and research fields. The third theme discussed how the attitudinal (i.e., negative views of exercise) and practical (e.g., funding) barriers also impacted the inclusion of exercise in ED treatment. In
light of the barriers to incorporating exercise into ED treatment, the panel did highlight physical (e.g., increased muscular-skeletal and cardiovascular health) and psycho-social (e.g., greater self-esteem and body image, increased mood) benefits exercise could have for patients with an ED. The last theme centered on how a safe and appropriate exercise protocol might be designed. The panel recommended that an exercise protocol should be progressive and tailored to an individual’s needs, paying particular attention to a patient’s health status, their exercise goals and preferences. A program should be designed to include a variety of exercise modalities, specifically targeting flexibility, resistance training and cardiovascular activity, and should be undertaken in a supportive environment without a focus on body shape or image.

Based on these results, there is a need to move forward to dispel the historical views concerning exercise for patients with EDs as exercise restriction during treatment could be doing patients more harm than benefit. Decreasing the knowledge gap between researchers and clinicians and addressing the fears surrounding exercise is necessary. Utilising multidisciplinary teams that include an exercise specialist will be extremely valuable as this individual could help to bridge the research knowledge gap and help inform clinical practice. Furthermore, exercise specialists can help design and implement safe and appropriate exercise protocols that are individually tailored, with consideration of the most beneficial modalities and supportive environments.

This foundational study significantly contributes to the ED field as it provides a starting point to understanding the complex issues and challenges surrounding the utilisation of exercise as a ED treatment method. Moreover, it provides concrete recommendations for moving this topic area forward in order to provide physical, mental and emotional benefit to those managing an ED.
6.2 Strengths and Limitation

This study has a number of strengths which will be valuable to future ED programming across Canada and globally. To the best of the researcher’s knowledge, it is the only study that explored the role of exercise in EDs by consulting ED expert opinions, and the first to offer recommendations for the design of an exercise protocol for the ED patient population. Moreover, the use of qualitative methodologies allowed an in depth exploration of the panel’s personal opinion’s and belief’s surrounding the research topic. In addition, an adequate (n=13), diverse sample provided further opportunity to gather valuable in-depth data. Panel experts included a mix of clinical and research professionals working in the ED field, with educational training in a variety of disciplines, including occupational therapy, psychology, dietetics, psychiatry, social work, nursing. Furthermore, panel members where from different geographic locations, including North America and Europe, thus providing a wide global perspective that reflects different health care systems and different treatment methods. The interview process was diligent and techniques such as the use of a tape recorder, peer review, audit trail, methodological coherence and concurrent data collection and analysis, which are supported by the research literature, were used to ensure aspects of methodological rigor (Morse et al., 2002). In turn, it improved the reliability, validity and generalisability/transferability of this study.

Although this study included a number of strengths, it is not without limitations. There were characteristics of the expert panel, which limits the generalisability/transferability of the data present within this study to the larger field of EDs. Despite the sample being adequate and diverse, all panel experts had a particular interest in exercise and the role it plays in ED treatment, and as a result there may be other external or confounding factors that have not been presented here. Additionally, to ensure participant convenience and based on geographic location
and resources, most interviews were conducted via Skype or teleconference, which may have also limited the richness of data obtained. Furthermore, although all efforts were made to ensure anonymity for the panel, reporting bias may be found in the experiences and opinions the panel members were willing to disclose due to the controversial nature of the topic at hand. Another limitation of this study was the nature of the interview guide, in that the guide was formulated with the assumption that individuals would have knowledge of exercise and ED literature, however, some participants within this study were unaware this literature existed, and as result some of their recommendations were based solely on anecdotal knowledge of the topic. Lastly, the interviews were conducted equally to the best of the researchers ability, however due to the novelty of conducting semi-structured interviews for the researcher (DQ), there may have been differences in the interview process between the first and last interviews conducted.

6.3 Future Direction and Recommendations

This study was exploratory in nature and elicited rich data through a qualitative approach. Although this was determined as the best method for the objectives of this study, the next step to understanding this complex issue is to undertake intervention and experimental research to gain further information concerning protocol feasibility and behaviour change relative to the ED population. This might include examining different exercise protocols for specific EDs (i.e., AN, BN, etc.), examining differences between those who have previously been diagnosed as an abusive exerciser in comparison to those who have not, and investigating long term outcomes of exercise interventions for those with EDs. Furthermore, it would be valuable to be able to determine the cost-benefit of these interventions in the larger public health domain. Specifically, if an intervention aids in decreasing rate of relapse and time spent in hospital for those with an ED then this would have a significant impact on health care cost. Thus, future research should
consider a cost-benefit analysis.

Furthermore, incorporating multidisciplinary treatment teams (e.g., exercise physiologists, psychologists, nutritionists, exercise specialist, etc.) into the treatment for EDs will be extremely valuable for knowledge translation and ‘real world’ transferability. These multidisciplinary teams could be used to provide education to both patients and health professionals concerning the barriers and benefits of exercise for ED treatment, as well as help to develop safe and appropriate exercise protocols that are tailored to the specific needs of each patient. Lastly, this research was a first step in understanding the important role of exercise in ED treatment and what an appropriate exercise protocol may look like for this particular population. However, these recommendations were broad due to the limited knowledge surrounding the management and treatment of exercise for patients with EDs, thus the long term goal of this foundational research is to work with multidisciplinary teams in understanding how to manage abusive exercise as a symptom of EDs and developing specific exercise guidelines to support treatment of EDs.
References


Appendices

Appendix A: DSM-5 Diagnostic Criteria

Anorexia Nervosa
Diagnostic Criteria

A. Restriction of energy intake relative to requirements, leading to a significantly low body weight in the context of age, sex, developmental trajectory, and physical health. *Significantly low weight* is defined as a weight that is less than minimally normal or, for children and adolescents, less than that minimally expected.

B. Intense fear of gaining weight or of becoming fat, or persistent behavior that interferes with weight gain, even though at a significantly low weight

C. Disturbance in the way in which one’s body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight.

*Specify whether:

**(F50.01) Restricting type:** During the last 3 months, the individual has not engaged in recurrent episodes of binge eating or purging behavior (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas). This subtype describes presentations in which weight loss is accomplished primarily through dieting, fasting, and/or excessive exercise.

**(F50.02) Binge-eating/purging type:** During the last 3 months, the individual has engaged in recurrent episodes of binge eating or purging behavior (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas).

Subtypes
Most individuals with the binge-eating/purging type of anorexia nervosa who binge eat also purge through self-induced vomiting or the misuse of laxatives, diuretics, or enemas. Some individuals with this subtype of anorexia nervosa do not binge eat but do regularly purge after the consumption of small amounts of food.

Crossover between the subtypes over the course of the disorder is not uncommon; therefore, subtype description should be used to describe current symptoms rather than longitudinal course.

Bulimia Nervosa
Diagnostic Criteria 307.51 (F50.2)

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:

B. Eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than what most individuals would eat in a similar period of time under similar circumstances A sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).

C. Recurrent inappropriate compensatory behaviors in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, or other medications; fasting; or excessive exercise.
D. The binge eating and inappropriate compensatory behaviors both occur, on average, at least once a week for 3 months.
E. Self-evaluation is unduly influenced by body shape and weight.
F. The disturbance does not occur exclusively during episodes of anorexia nervosa.

**Other Specified Feeding or Eating Disorder 307.59 (F50.8)**

This category applies to presentations in which symptoms characteristic of a feeding and eating disorder that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning predominate but do not meet the full criteria for any of the disorders in the feeding and eating disorders diagnostic class. The other specified feeding or eating disorder category is used in situations in which the clinician chooses to communicate the specific reason that the presentation does not meet the criteria for any specific feeding and eating disorder. This is done by recording “other specified feeding or eating disorder” followed by the specific reason (e.g., “bulimia nervosa of low frequency”).

Examples of presentations that can be specified using the “other specified” designation include the following:

A. **Atypical anorexia nervosa**: All of the criteria for anorexia nervosa are met, except that despite significant weight loss, the individual’s weight is within or above the normal range.
B. **Bulimia nervosa (of low frequency and/or limited duration)**: All of the criteria for bulimia nervosa are met, except that the binge eating and inappropriate compensatory behaviors occur, on average, less than once a week and/or for less than 3 months.
C. **Binge-eating disorder (of low frequency and/or limited duration)**: All of the criteria for binge-eating disorder are met, except that the binge eating occurs, on average, less than once a week and/or for less than 3 months.
D. **Purging disorder**: Recurrent purging behavior to influence weight or shape (e.g., self-induced vomiting; misuse of laxatives, diuretics, or other medications) in the absence of binge eating.
E. **Night eating syndrome**: Recurrent episodes of night eating, as manifested by eating after awakening from sleep or by excessive food consumption after the evening meal.
Appendix B: Interview Guide

Interview Guide

1) Looking at the demographics form, I see you have worked in the field for XX years, what drew you to the field?

2) I’m very interested in the role of exercise in treatment of ED. Can you tell me what role does exercise currently play in the overall treatment of ED?
   Probes:
   a. Is it a fairly recent phenomenon?
   b. Is it widely prescribed?

3) There appears to be controversy in the literature on the potential harms and benefit that exercise can have in ED treatment. Literature suggests that some clinicians/health professionals are hesitant to utilise exercise as a supportive treatment in ED, what is your perspective on this issue?
   Probes:
   a. Why are some opposed to it?
   b. Should it be included?
   c. Do you currently incorporate it? If so, what does this look like.

Specific exercise prescription questions

4) What are some of the benefits of incorporating evidence based exercise program into treatment of ED patients?
   Probe:
   a. Are there specific benefits for those with Anorexia Nervosa (AN)? Bulimia Nervosa (BN)? Eating Disorders Not Otherwise Specified (EDNOS)

5) Could you identify any potential harms or concern that an appropriate and prescribed exercise protocol could have on an ED patient?

6) What are some of the barriers to incorporating an evidence based exercise program into the general treatment of EDs?
   Probe:
   a. Are there specific barriers for inpatients vs. outpatients? What are these?

7) What are the top five aspects/criteria you feel should be considered prior to prescribing exercise to a patient?
   Probes:
   a. Based on physical health status?
   b. Based on mental health status?
   c. Differences in terms of disease (AN, BN, EDNOS)
   d. Differences in terms of inpatient/outpatient status?
e. Difference in terms of gender?

8) What do you think an exercise program would look like for the ED population?
   **Probes:**
   a. What types (e.g., cardiovascular, flexibility, resistance training other)?
   b. How often (e.g., times per week, duration of each session)?
   c. What intensity (e.g., light, mod, vig activity- *these can be defined if needed*)?

9) How would prescribed exercise differ between individuals with different EDs and patient settings?
   **Probes:**
   a. Differences between AN, BN, EDNOS
   b. Differences between inpatient and outpatient?

10) What would you say would be the most optimal setting to perform these exercises?
    **Probes:**
    a. Group or individual based?
    b. Supervised or non-supervised?
    c. Within a facility, gym, outdoors?

11) Do you think the use of fitness technologies or apps (outside of use for music) should be permitted during the exercise session or at any time? Why or Why not?
    **Probe:**
    a. Fitbit, pedometers, apple watch, and heart rate monitors?

12) Do you have any additional comments you would like to make about on exercise prescription and EDs?

Thank you for participating!
Appendix C: Letter of Initial Contact

Letter of Initial Contact for Interview Participants

Dear XXXXX,

As an expert in the field of eating disorders (EDs), I am writing to invite you to participate in a research study that is exploring the role of exercise in the treatment and management of eating disorders. This study is led by researchers from the School of Health and Exercise Sciences at University of British Columbia, Okanagan and will inform a Masters Student’s Thesis.

The main purpose of this research is to gain a better understanding of the role of exercise in the treatment and management of EDs. Given your expertise in this field, we would like to explore your perceptions, opinions and beliefs concerning exercise as a supportive treatment for those diagnosed and managing EDs. Based on the outcomes of this research, we hope to identify initial recommendations for a safe exercise protocol (e.g., type, intensity, duration of exercise) that may be used as a supportive treatment for those diagnosed and managing EDs.

To do this, we will be conducting semi-structured interviews with experts throughout Canada and the United States. Ideally interviews will be conducted face to face, however, if this method in unavailable due to geographical location and/or availability, we will conduct the interviews via, Skype or teleconference.

As an expert in the field, I would like to invite you to participate in a 1.5hour interview session at a time and location that is convenient to you.

I appreciate your consideration to the above request and would be pleased to provide you with any additional information about this study. Please feel free to contact me via email at danikaquesnel@gmail.com or by telephone at 204-894-3181. I look forward to your response at your earliest convenience.

Thank you for your time,

Danika Quesnel, BHK
School of Health and Exercise Sciences
University of British Columbia
Kelowna, BC
Appendix D: Consent Form

Study Title: Exercise in the Treatment and Management of Eating Disorder

Lead Investigators

Dr. Cristina Caperchione, School of Health and Exercise Sciences, UBC Okanagan
cristina.caperchione@ubc.ca, 250-807-9679

Co-Investigators

Danika Quesnel, Master Student, School of Health and Exercise Sciences
danika.quesnel@gmail.com

Dr. Sally Stewart, School of Health and Exercise Sciences, UBC Okanagan sally.willis-stewart@ubc.ca, 250-807-9684

Dr. Maya Libben, School of Psychology, UBC Okanagan maya.libben@ubc.ca, 250-807-9026

Dr. Nelly Oelke, School of Nursing, UBC Okanagan nelly.oelke@ubc.ca, 250-807-9880

Purpose of the study

The main purpose of this research is to gain a better understanding of the role of exercise in the treatment and management of eating disorders (EDs). Given your expertise in this field, we would like to explore your perceptions, opinions and beliefs concerning exercise as a supportive treatment for those diagnosed and managing EDs. Based on the outcomes of this research, we hope to identify initial recommendations for a safe exercise protocol (e.g., type, intensity, duration of exercise) that may be used as a supportive treatment for those diagnosed and managing EDs.

Study Procedures

If you agree to participate in this study you will be asked to commit approximately 45mins-1.5 hours of your time to participate in a semi-structured interview which will occur via skype, teleconference or face to face, depending on your availability and geographic location. You will be contacted by a co-investigator (Danika Quesnel) to organise a convenient time and place for the interview. During the interview you will be asked a set of questions to explore your perceptions, opinions and beliefs concerning the role of exercise in the treatment and management of EDs. Please be advised that your interview will be recorded with a digital audio-recorder. Once the data has been collected and transcribed you will be asked to review your interview transcript to ensure accuracy, which may take an additional hour. Once the data has been analysed, you may also be contacted (at a later date) to provide further expert advice concerning initial recommendations for a safe exercise protocol.

Potential Risks and Benefit

If you participate in this study, there are no risks greater than what you would experience in your
daily life. Potential benefits to participating in this research study include: opportunity to provide insight and share your expert opinions, perspectives and concerns regarding exercise as a supportive treatment to EDs. Furthermore, your participation will assist in identifying best practice approaches to help inform the future development of exercise recommendations as a supportive treatment method (in addition to current practices) for ED or disordered eating.

Confidentiality

Participation in the study is free and voluntary. All interview data will remain confidential. All documents will be identified by a coded number and kept in a password-protected computer stored in the secure laboratory of the Primary Investigator (Dr. Caperchione). Only the Primary Investigator and the Co-Investigators will have access to the digital audio files and transcripts. Finding from this study will be published in a Master’s Thesis by Co-investigator Danika Quesnel and may be shared through conference presentations, articles for publication and other media outlets. Findings from this research will be available on the internet via cIRcle. Participants will not be identified by name in any published reports of the completed study. An electronic or hard copy version of the research outcomes will be available to you upon request.

Contact for information about the study

If you have any questions or would like additional information, please contact Danika Quesnel at 204-894-3181 or by email danika.quesnel@gmail.com or Cristina Caperchione at 250-807-9679 or by email Cristina.caperchione@ubc.ca.

Contact for concerns about the rights of research participants

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Services at 1-877-822-8598 or the UBC Okanagan Research Services Office at 250-807-8832. It is also possible to contact the Research Participant Complaint line by email (RSIL@ors.ubc.ca).

Consent

Participation in this study is completely voluntary. You may refuse to participate or withdraw from the study at any time without penalty or prejudice. If you choose to withdraw from the study, the data collected to date will not be used at any point throughout the study.

- Your signature below indicates that you have received a copy of this consent form for your own records
- Your signature indicates that you consent to participate in this study

_______________________  _____________________  _______________________
Participant’s Name                  Email Address                  Date
Appendix E: Demographics Form

Demographics

Exercise in the Treatment and Management of Eating Disorders

1) Date of birth: __________________________________________

2) Sex: ☐ Male  ☐ Female

3) Please specify your job position: ☐ Researcher/Academic

☐ Physician  ☐ Social Worker

☐ Occupational Therapist  ☐ Nurse  ☐ Psychologist  ☐ Psychiatrist

☐ Dietitian  ☐ Other: ___________________________

4) Please identify the setting in which you work: ☐ In hospital  ☐ Research Setting  ☐ Private Clinic

☐ Medical Clinic

5) What is your highest, completed level of education: ☐ Postgraduate degree (e.g., PhD)  ☐ Graduate degree at a university (e.g., MSc)  ☐ Graduate diploma/ certificate at college

☐ Undergraduate degree  ☐ Other: ___________________________

6) Years working in the field of Eating Disorders ______________________ 7) Approximately how many Eating Disorder patient do you see or treat a year?

8) What is the most common Eating Disorder that you treat? ☐ Anorexia Nervosa  ☐ Bulimia Nervosa  ☐ Eating Disorder Not Otherwise Specified

☐ Binge Eating Disorder

9) Do you currently prescribed exercise in your treatment protocol? ☐ Yes  ☐ No

If yes, please describe what that entails;

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

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