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A Guide for the Psychosocial Treatment of Infertility

Linnea Esselstrom

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LOMA LINDA UNIVERSITY
School of Behavioral Health
in conjunction with the
Department of Psychology

A Guide for the Psychosocial Treatment of Infertility

By

Linnea Esselstrom

Project in Partial Fulfillment of
the Requirements for the Degree of
Doctor of Psychology

May 2014

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ABSTRACT

A Guide for the Psychosocial Treatment of Infertility

by

Linnea Esselstrom

Doctor of Psychology, Graduate Program in Clinical Psychology

Loma Linda University, Loma Linda, California, June 2014

Dr. Adam Arechiga, Chairperson

Infertility is a growing area of the medical field and a common problem experienced by couples and individuals during their lifetime. Stress is known to decrease fertility in men and women, and may also impact fertility treatment outcomes. Psychological burden is associated with treatment discontinuation, due to the physical and emotional stress associated with the personal, social, and medical aspects of infertility. A review of the research literature was conducted to examine the impact of infertility on social and psychological domains, as well as identify the relationship between stress, distress, and infertility, to inform how mental health services may improve adjustment to infertility. This review revealed an initial appreciation for the association between stress, distress, and infertility, as well as an identification of mental health needs in this population; however, the heterogeneity of current empirical studies means additional research is necessary to better understand the complexity of this life experience. Based on a synthesis of these studies, a brief guide was created to inform mental health professionals working with individuals and couples experiencing infertility about important treatment considerations, methods of assessment, and recommended psychosocial interventions.

CHAPTER 1

INTRODUCTION

Clinical Importance of the Problem

Infertility in the United States population.

Infertility is a common problem experienced by couples and individuals during their lifetime, and its treatment is a growing area of the medical field. Infertility is defined as an inability to become pregnant after one year of regular sexual relations without use of contraceptives (Chandra, Copen, Hervey Stephen, 2013). According to the 2006-2010 National Survey of Family Growth conducted by the Center for Disease Control and Prevention (CDC), there are an estimated 6.7 million women of child-bearing age in the United States who experience difficulties with conceiving and carrying a pregnancy to term, which is approximately 10.6% of the female population ages 15-44. This represented a slight decline from the 2002 estimate of 7.3 million women experiencing difficulty conceiving or carrying to live birth, but is still significantly higher than the 1982 estimate of 4.5 million women affected. Increased rates of infertility may partially reflect improved surveying techniques to better identify those experiencing fertility difficulties. Results from a survey of veterans who served during the Operation Enduring Freedom and Operation Iraqi Freedom wars revealed lifetime rates of infertility at 15.8% for women and 13.8% for men (Katon et al., 2014). Rates for an inability to carry a pregnancy to term were similar across racial and ethnic groups, with 9.7% of Hispanic or Latina, 11.1% of White, and 11.6% of African-American females reporting difficulties with becoming pregnant or carrying to live birth (Chandra et al., 2014). Asian-American women reported a lower rate of 6.7 percent. Infertility rates in men were

reported at 7.2% for men ages 25-29 compared to 14% for men ages 40-44. Similar to women, age is a major contributor to fertility difficulties, although this appears to occur at a later age for men than it does for women.

In 2002, approximately 1.2 million women had medical appointments related to fertility issues (CDC, 2011). Fertility services within this context include medical tests to diagnose infertility, medical advice, treatments to help achieve pregnancy, and other services outside routine prenatal care. Approximately 11.9% of women ages 15-44 have received fertility services at some point in their lives (CDC, 2012a). Any fertility treatment where both sperm and eggs are handled is classified as assisted reproductive technology (ART) (CDC, 2011). From 2000 to 2009, the number of ART cycles increased by approximately 50%, and the number of live births roughly doubled (CDC, 2011). This demonstrates an increased utilization of services, as well as greater treatment success.

Infertility, Stress, Distress, and Treatment Outcomes

As utilization of infertility services has increased and the types of services offered has been refined and expanded, more attention has been paid to the biopsychosocial experience of infertility. Studies have found that infertility is rated to be one of the most stressful life experiences for women (K. Bell, 2013; Lykeridou, Gourounti, Deltsidou, Loutradis, & Vaslamatzis, 2009). The majority of fertility treatment occurs to the female partner, regardless of the underlying cause(s) of infertility (K. Bell, 2013; Benyamini et al., 2008). Considering these factors, research has begun examining the impact stress has, if any, upon fertility and treatment outcomes. Recent

results from a study by Lynch, Sundaram, Maisog, Sweeney, and Buck Louis (2014) found that high levels of salivary alpha-amylase in women attempting natural conception contributed to a 29% reduction in the ability to become pregnant compared to women with normal levels of alpha-amylase. Alpha-amylase is a protein associated with the activation of the sympathetic adrenomedullary system, which is responsible for handling acute stress. Noto, Sato, Kudo, Kurata, and Hirota (2005), found in their study of the physiological response to a mental arithmetic task, that alpha-amylase significantly increased after the stressor (mental arithmetic task). Additionally, higher alpha-amylase was positively associated with mental stress as measured by the State-Trait Anxiety Inventory. In particular, mental stress was associated with state anxiety, which is a measure of acute anxiety. Cohen, Kessler, and Gordon (1995) defined stress as the process that occurs when an individual appraises an environmental demand to be stressful, which contributes to an emotional, behavioral, or biological stress response, such as distress. While distress and stress are often used interchangeably in research, stress occurs in response to an environmental stressor, whereas distress can arise from a number of sources (Matthiesen, Frederiksen, Ingerslev, & Zachariae, 2011).

Matthiesen et al. (2011) conducted a meta-analysis of current literature assessing stress, distress, and outcome of ART. The authors found a negative association between stress and clinical pregnancy, as well as between state or trait anxiety and clinical pregnancy. Overall, there was no association between depression and clinical pregnancy. In this study, clinical pregnancy was measured through ultrasound confirmation or definitive clinical symptoms of pregnancy. Trait anxiety was defined as a predisposition to feeling anxious, as measured by the State-Trait Anxiety Inventory. The authors also

found that age of the study sample, first-time ART patients, and duration of infertility moderated treatment outcome. Younger patients showed a stronger association between depression and poor treatment outcomes. Patients seeking ART for the first time had a stronger association between state anxiety and reduced chance of clinical pregnancy. Additionally, those who had experienced a longer duration of infertility had a stronger relationship between state or trait anxiety and inability to reach clinical pregnancy. The authors cautioned overestimating the influence stress and distress may have on fertility treatment outcomes, as most of these relationships were small, though statistically significant. However, small effect sizes may reflect the heterogeneity of the current research as well as the small number of studies sampled, which limits the ability to accurately understand the role stress and distress play in the outcome of ART.

Furthermore, there were an insufficient number of studies examining the relationship of stress, distress, and initial measures of pregnancy outcome. More specifically, there were no studies examining the number of oocytes (immature eggs) retrieved and whether the embryo implants. These early phase measures are crucial to the outcome of in vitro fertilization (IVF). The limited research available suggests there is a negative impact of anxiety, depression, and stress on the outcome of ART. In a recent study by Turner et al. (2013), women with lower stress scores and higher ratings of self-efficacy at time of egg retrieval demonstrated higher pregnancy rates after IVF than women with poorer ratings. This suggests that the period of egg maturation and retrieval may be particularly sensitive to the effects of mental stress.

Though the majority of infertility treatment does not occur to the male partner, there is research demonstrating an association between psychological stress and poorer

semen quality in men. In particular, Gollenberg et al. (2010) found that increased number of stressful life events (e.g. job loss, death of a close family member, financial problems) was significantly associated with lower sperm concentration. In addition to general stress impacting semen quality, it appears that infertility-specific distress may also reduce fertility in men. Pook, Tuschen-Caffier, & Krause (2004) studied sperm quality and infertility distress in men during two visits while participants were undergoing their fertility workup. Results showed the level of infertility distress at follow-up negatively impacted the sperm quality from baseline assessment. This is consistent with an earlier study by Pook, Röhrle, and Krause (1999), who found that men who reported higher infertility distress were 3.31 times more likely to show a deterioration in sperm concentration, and 1.89 times more likely to show a decrease in the motility (the ability of sperm to move properly to the egg). Bhongade et al. (2014) found that men with higher scores in anxiety and depression had lower sperm count. Additionally the number of sperm with normal shape and movement was lower in more distressed men compared to men with normal levels of anxiety and depression. This occurred as a result of lower testosterone levels and higher levels of luteinizing hormone and follicle-stimulating hormone, which work synergistically to create sperm. Lower testosterone serum levels are related to a secondary rise in luteinizing and follicle-stimulating hormones, which decreases the quality of the seminal fluid when imbalanced.

It is clear that there is a direct association between infertility stress and sperm quality for men (Pook et al., 1999; Pook et al., 2004; Gollenberg et al., 2010), while the association between stress, distress, and fertility treatment outcome remains less clear for women (Matthiesen et al., 2011). The heterogeneity of stress, distress, and fertility

treatment outcome research makes it difficult to fully understand the relationship between these variables, but initial conclusions suggest psychological stress and distress may negatively impact treatment outcome (clinical pregnancy) to a small extent (Matthiesen et al., 2011). For patients wishing to maximize their potential for pregnancy, particularly given the expensive nature of treatment (Kissil & Davey, 2012), identifying and managing psychological stress may be an important part of the fertility treatment process.

The Infertility Experience

In addition to the biological impact of infertility, social and personal domains are also highly effected by this life event (K. Bell, 2013). For many women who experience infertility, the desire to have a child is a conscious choice rather than one of obligation, and the degree to which infertility interferes with an individual's life is most predictive of treatment seeking (K. Bell, 2013). Additionally, the ability to achieve life goals appears to have an important contribution to the psychological well-being of women experiencing infertility (Thompson, Woodward, & Stanton, 2011). Women who are struggling or unable to become pregnant may also experience disruption in their social relationships, in part due to a tendency of others to look less favorably upon a couple's childlessness state (K. Bell, 2013), and a desire by the infertile women to withdraw socially due to feelings of disconnection and exclusion around women with children (Ferland & Caron, 2013; Loftus & Andriot, 2012). The impact on social and personal domains contributes to the psychological burden women feel during the infertility experience. Additionally, the infertility treatment process appears to increase infertility-related distress over time (Greil et al., 2011a). The difficulties of treatment, such as insensitive providers and multiple

medical appointments may contribute to women discontinuing treatment (Ferland & Caron, 2013).

Similar to research on women, the infertility experience appears to impact men in social and personal ways. In particular, involuntary childlessness increases social and physical stress in men (Peronace et al., 2007). Some men also report increased sexual stress (Peterson, Newton, & Feingold, 2007b) as well as decreased sexual satisfaction (Smith et al., 2007). Men may also struggle with the secondary role they take during infertility treatment, which is one of supporting their partner during the process (Dooley, Nolan, & Sarma, 2011; Herrera, 2013). Wischmann, Scherg, Strowitzki, and Verres (2009) found that men seeking infertility counseling with their wives expressed feelings of helplessness to assist their partner's in coping with infertility. The infertility experience for men is less known given that the majority of research has focused on women (Culley, Hudson, & Lohan, 2013), emphasizing the secondary role men often take during the treatment process.

Pasch, Dunkel-Schetter, and Christensen (2002) emphasize the importance of understanding infertility as a couple's issue, regardless of infertility etiology. This is particularly important given that couple's incongruence in their infertility experience can lead to higher distress levels in partners (Benyamini, Gozlan, & Kokia, 2009). Indeed, Peterson, Newton, and Rosen (2003) found that marital adjustment was higher in couples who endorsed similar levels of social concern (e.g. alienation from friends and family, sensitivity to comments about fertility). This emphasizes that the social impact of infertility is relevant at both an individual and couple level. A partner's support may also be important in the ability of men to receive support from other sources (Dooley et al.,

2011). Low levels of support from a partner and family members is associated with higher infertility stress in couples (Martins, Peterson, Almeida, Mesquita-Guimarães, & Costa, 2014). Despite the stressful nature of infertility, many couples report marital benefit after dealing with infertility (Schmidt, Holstein, Christensen, & Boivin, 2005b). Persistent infertility appears to more negatively impact couples (Gerrity, 2001), particularly for couples who have spent a longer time in treatment (Sina, ter Meulen, & de Paula, 2010). Helping couples to recognize potential marital benefit, as well as better identifying and supporting those vulnerable to decreased marital satisfaction secondary to infertility may help couples to positively adjust to the infertility experience.

Understanding the psychological and social impact of infertility at an individual and couple level is important when considering how this may impact couples engagement in treatment. In a study by Rajkhowa, Mcconnell, and Thomas (2006), psychological stress was identified as a reason for discontinuation of treatment for 36% of couples. This is similar to the 34% drop out rate found in a study by Domar, Smith, Conboy, Ianonne, & Alper (2010), where primary reasons identified for drop out were psychological burden and a need to take a break from treatment. Olivius, Friden, Borg, and Bergh (2004) and Van den Broeck et al. (2009) also found that psychological burden has the strongest impact on couple's decision to discontinue fertility treatment. The impact of psychological burden on treatment discontinuation is particularly important given that some couples may not engage in treatment long enough to maximize their potential for attaining pregnancy. For example, in Sweden couples are offered 3 free cycles of IVF/ICSI; however, in a study by Olivius, Friden, Lundin, and Bergh (2002) 65% of couples who did not reach pregnancy also did not avail themselves to the full treatment

program. Hammarberg, Astbury, & Baker (2001) found in a sample of Australian women who are eligible for 6 free cycles of IVF, most discontinued treatment after 3 cycles. The most common reported reasons for discontinuing IVF treatment were “I had enough” (66%), “Emotional cost” (64%), and “Could not cope with more treatment” (42%). Identifying and assisting couples who report higher levels of stress and distress may be additionally important in helping them to manage the infertility treatment process, be it to continue or discontinue treatment.

Aim of Current Study

Fertility treatment is a growing area within the medical field, with ART cycles roughly doubling between 2000 and 2009 (CDC, 2011). Additionally, 1.2 million women attended medical appointments at fertility clinics for purposes of diagnosis, medical advice, and treatment seeking (CDC, 2012a). As improvements in fertility treatment have increased ability of couples to attain parenthood, researchers have begun focusing on the personal, social, and biological impact of infertility. There is a clear association between psychological stress and decreased fertility for men (Pook et al., 1999; Pook et al., 2004). Psychological stress also appears to impact fertility treatment outcomes for women though less is understood about the nature of this relationship (Matthiesen et al., 2011; Turner et al., 2013). Additionally, psychological burden contributes to discontinuation of fertility treatment (Olivius et al., 2004; Van den Broeck et al., 2009). A review of the research literature was conducted to examine the impact of infertility on social and psychological domains, as well as identify the relationship between stress, distress, and infertility to inform where mental health services may improve adjustment to infertility,

and increase management of infertility-related stress. The literature revealed an initial appreciation for the relationship between infertility and stress, as well as an identification of mental health needs and patient openness to such services; however, heterogeneity of studies within infertility research make it difficult to fully comprehend the complexity of this life experience.

The aim of this paper is to offer a brief guide to clinical psychologists and other mental health professionals working within or providing consultation to fertility clinics, in order to better address the mental health needs of individuals and couples seeking fertility services. The proposed guide will provide an overview of the medical treatment of infertility, identify important psychological and social components of infertility, and offer recommended psychological interventions based upon presenting concerns and phase of treatment. The guide will be based upon literature examining stress, distress, and infertility, and will incorporate current research that identifies mental health need and demonstrates efficacious psychological treatment outcomes.

CHAPTER 2

REVIEW OF LITERATURE

Defining Infertility

Infertility is defined as the inability to become pregnant after one year of regular sexual relations without the use of contraceptives (Chandra et al., 2013). Impaired fecundity is defined as the inability for a woman to carry a pregnancy to term and not simply the inability to conceive. These are the generally accepted definitions for infertility and impaired fecundity; however, definitions may vary across research and clinical settings. For example, medical professionals may diagnose infertility in women over 35 years of age after only six months of unsuccessful attempts to become pregnant so as not to delay the treatment process (CDC, 2012a). In contrast, K. Bell (2013) suggested that the 1-year baseline is too short and a 2- to 3-year period is more accurate for diagnosing infertility because many couples conceive naturally within this longer timeframe. Diagnosis of infertility typically occurs when people seeking to become pregnant are unable to fulfill this life goal, and therefore bring this problem to the attention of their healthcare providers (Greil, Shreffler, Johnson, McQuillan, & Slauson-Blevins, 2013). Some women who seek fertility services have previously conceived children. When an additional pregnancy attempt is met without success, this is called secondary infertility (RESOLVE, 2012b).

An examination of the current research literature reveals that methodologies do not typically differentiate between infertility and impaired fecundity. While most research uses the term infertility, it is unclear if participants also include those with impaired fecundity, as treatment outcomes are typically measured through treatment

success (e.g. pregnancy) or treatment failure (e.g. childlessness) rather than carrying to term. While the term infertility will be used throughout this paper, it is acknowledged that some studies may also capture the experience of those with impaired fecundity, which may or may not present in psychologically unique ways compared to the infertility experience.

Risk Factors and Causes of Infertility

Risk Factors

There are multiple risk factors associated with infertility across biological, psychological, and environmental domains. The risk factor with the strongest association with impaired ability to become pregnant is age (CDC, 2005). For example, women ages 15-29 have a 7% rate of difficulty in becoming pregnant, which increases to 37% for women ages 40-44. According to the National Fertility Association, RESOLVE (2012b), a woman's ability to become pregnant has decreased from 90% to 67% by age 40. Within another five years, chances of becoming pregnant are 15%. Contributions to decreasing fertility include a higher presence of health problems that interfere with pregnancy as well as more chromosomal abnormalities in a woman's eggs as they age. Older women also have a higher rate of miscarriage.

Possible behavioral and environmental contributions to decreased fertility include smoking, excessive alcohol use, poor diet, engaging in unprotected sex, athletic training, being overweight or underweight, and environmental exposures (CDC, 2012b). Individuals who engage in unprotected sex are at a higher risk for contracting sexually transmitted diseases, some of which are known to impact fertility in both men and

women, including chlamydia and gonorrhea (CDC, 2013). Smoking is suggested to increase risk of infertility in women and reduce sperm production in men (RESOLVE, 2012b). In one study, women who did not smoke were significantly more likely to become pregnant than women who did smoke (Lynch et al., 2014). Environmental risks, including chemical, radiation, and high temperatures, may also reduce fertility in men and women (RESOLVE, 2012b). Women who are overweight have reduced ability to become pregnant, as excess body fat can alter reproductive cycles due to estrogen overload. Studies have demonstrated that weight loss between 5-10% in overweight women significantly improved rates of spontaneous pregnancy (Khaskheli, Baloch, & Baloch, 2013; Kort, Winget, Kim, & Lathi, 2014). On the other end, women who are underweight may also experience disturbances in their menstrual cycle, even to the point that their reproductive processes completely shut down (RESOLVE, 2012b). Diet should also be a consideration, as nutritional deficiencies such vitamin B012, zinc, folic acid, and iron may interfere with normal reproductive cycles. Intense exercise is additionally known to contribute to irregular menstrual cycles.

Causes of Infertility

Female Factor

There are a number of biological conditions that interfere with the ability to conceive. The leading cause of infertility among women is ovulatory disorders, which the National Infertility Association RESOLVE (2012b) reported accounts for 30% of infertility cases. Ovulatory disorders refer to any condition that impacts ovulation. Of the 2009 ART cycles conducted using fresh, nondonor eggs or embryos, approximately 6.8%

were for couples with ovulatory dysfunction (CDC, 2011). Polycystic ovarian syndrome (PCOS) is a prevalent ovulatory disorder, which is characterized by an imbalance in the female sex hormones. It is a highly underdiagnosed condition in women known to increase risk for cardiovascular disease, type 2 diabetes, and cancer (RESOLVE, 2012b). Symptoms include irregular or absent periods, lack of ovulation, weight gain and acne, and excessive facial hair. Women receiving ART treatment may also be considered poor responders to treatment when they do not make an optimal number of eggs despite large doses of ovulation stimulating medications. Some women also experience premature ovarian failure, which is the cessation of menstrual periods before age of 40. RESOLVE (2012b) estimates 1 in 1000 women ages 15-29 and 1 in 100 of women ages 30-39 experience this condition. There are few treatment options for premature ovarian failure. Diminished ovarian reserve is another ovulatory disorder that refers to a reduced ability by the ovary to produce an egg (CDC, 2011). Advanced age is a contributor to diminished ovarian reserve, as are other congenital, medical, and surgical causes.

Uterine factors include abnormalities in the uterus that impact a woman's ability to conceive and carry a pregnancy to term. The abnormally developed uterus may occur due to congenital reasons, or be acquired from surgery or infection (RESOLVE, 2012b). Tubal factor infertility arises when a woman's fallopian tubes are blocked or damaged, leading to difficulty in fertilization and travel of an embryo to the uterus (CDC, 2011). Uterine factor infertility accounted for 1.4% while tubal factor accounted for 7.7% of couples receiving ART treatment in 2009. Additional considerations include secondary infertility due to chromosomal abnormalities, medical treatment such as chemotherapy for cancer, immunological problems, and other serious medical conditions.

Another common cause of infertility is endometriosis, which is a condition where the tissue that composes the uterine lining is found outside the uterine cavity (RESOLVE, 2012b). Approximately 3 to 5 million women suffer from endometriosis. In 2009, 4.2% of couples undergoing ART treatment had an infertility diagnosis of endometriosis (CDC, 2011). Luteal phase defect may also contribute to difficulty conceiving in women. This occurs when the endometrium is unprepared for implantation of the embryo, which is due to insufficient secretion of progesterone by the ovary or unresponsiveness of the endometrium to progesterone (RESOLVE, 2012b).

Male Factor

Male factor infertility includes low sperm count as well as poor sperm functioning, which contributes to difficulty in fertilization of an egg under normal conditions (CDC, 2011). For ART cycles conducted in 2009, male factor infertility was the primary infertility diagnosis for 18.8% of couples using fresh, nondonor eggs or embryos. Other biological contributors to male factor infertility include structural abnormalities of the reproductive system, ejaculatory disturbances, and immunologic disorders (RESOLVE, 2012b). Ejaculatory disturbances include impotence, the inability to develop or sustain an erection, as well as retrograde ejaculation, which occurs when sperm enters the bladder during ejaculation. Anabolic steroid use is associated with decreased fertility in men and typically resolves after anabolic steroid use is discontinued (Choy & Ellsworth, 2012).

Unexplained and Multiple Factor

When the systematic evaluation for the underlying cause of infertility fails, a diagnosis of unexplained infertility is provided (Fritz, 2012). To receive this diagnosis, ovulatory function, sufficient ovarian reserve, a normal uterine cavity, unobstructed fallopian tubes, and normal semen quality must be documented. This condition may affect individuals in psychologically unique way compared to individuals with a diagnosed infertility condition (Lykeridou et al., 2009; Romano et al., 2012). According to RESOLVE (2012b), an estimated one in five couples with infertility are diagnosed with unexplained infertility. For those receiving ART treatment using a fresh, nondonor egg or embryo in 2009, 13.5% were diagnosed with unexplained infertility (CDC, 2011). Couples may also face multiple factors that contribute to their infertility diagnosis. This may include more than one female cause that was diagnosed, which accounted for 10.6% of couples receiving treatment with a fresh, nondonor egg or embryo in 2009 (CDC, 2011). Multiple factor infertility can also occur when both male and female infertility factors were diagnosed. This accounted for 17.8% of the ART cycles in 2009.

Medical Treatment of Infertility

Diagnosis

Given the numerous factors that impact fertility for a couple, identifying the underlying cause of infertility is a complicated and often lengthy process. Couples struggling with infertility may receive initial treatment within primary care, depending on the comfort level of their provider (Wilkes, Hall, Crosland, Murdoch, & Rubin, 2007). Couples who wish to receive an advanced level of treatment at a fertility clinic must

undergo a thorough diagnostic interview. In a survey of fertility clinic programs' screening practices, all programs reported collecting information on the patients' physical health and age (Gurmankin et al., 2003). Nearly all programs collected information regarding drug use, marital status, HIV status, and mental health. The majority of clinics also gathered information on race, stability of relationship with spouse or partner, mental and physical health of existing children, sexual orientation, reasons for wanting a child, and financial stability. Other information collected included any previous pregnancies and associated complications, sexual history, duration of infertility, and assessment of physical symptoms (Fritz, 2012). Couples will also undergo a physical examination as an initial assessment for the underlying causes of infertility.

After the clinical interview and physical examination, couples begin the process of diagnostic testing, which may be followed sessions to discuss results and more testing until a final diagnosis is attained (Fritz, 2012). Medical tests of ovulation and semen quality are conducted when the initial evaluation process has not yet determined a diagnosis. For women, this may include measuring basal body temperature, a transvaginal ultrasound, serum progesterone measurements, and using ovulation predictor kits. Men provide a semen sample to assess the density of sperm and the quality of the sperm, which includes motility and morphology. Motility is the percentage of sperm that demonstrate purposeful forward movement, while morphology is determined by the shape of the sperm. Men may also undergo a urologic evaluation to assess for ejaculatory duct obstructions or an endocrine evaluation to assess hormone levels. Following this phase, women may undergo an ultrasound procedure to identify abnormalities in the uterine cavity or assess for fallopian tube obstruction. Women may also undergo tests of

ovarian reserve, which measure serum antimullerian hormone concentrations. Presence of this hormone drops as a woman's reproductive life nears its end. Diagnosis of infertility is a complicated and invasive process that typically occurs over multiple weeks and clinic visits.

Medical Interventions

Current technology offers a number of medical interventions to treat infertility. ART includes all fertility treatments where both eggs and sperm are handled, which was defined by the 1992 Fertility Clinic Success Rate and Certification Act (CDC, 2011). This law requires the CDC publish the pregnancy success rates for fertility clinics in the United States. A common ART intervention used is IVF, which requires the female partner follow a strict drug regimen to ripen the egg or eggs (RESOLVE, 2012a). When ready, the eggs are removed from the female ovary and fertilized with semen. After a period of incubation in a laboratory the embryo is placed in the uterus through the cervix. IVF may also involve a process called intracytoplasmic sperm injection (ICSI) that involves injecting a single sperm directly into the woman's egg (CDC, 2011). This procedure was developed for couples who have been diagnosed with male factor infertility; however, today it is used for other infertility diagnoses as well. In 2009, the reported success rate (live birth) for IVF with or without ISCI was approximately 34%.

Gamete intrafallopian transfer (GIFT) is an ART intervention similar to IVF. After egg retrieval, the egg and sperm are immediately transferred to the women's fallopian tubes with the use of laparoscope. No fertilization is documented prior to placement and this treatment is only recommended when sperm level is sufficient and

one or both fallopian tubes are functioning normally (CDC, 2011; Resolve 2012a). In 2009, treatments using GIFT resulted in live births approximately 4% of the time. A similar procedure to GIFT is zygote intrafallopian transfer (ZIFT). The major difference in ZIFT is that the women's eggs are fertilized in the laboratory before placement in the fallopian tubes. While fertilization is documented when the zygote is placed, there is no evaluation of the next phase of fertilization, the dividing embryo. In 2009, approximately 11% of ZIFT treatments led to live births.

There are additional components to consider during the process of selecting an ART intervention, including whether to use the woman's or donor eggs, as well as if the embryos are newly fertilized or frozen (CDC, 2011). Couples may also consider the use of donor sperm. These additional treatment options in combination with the selected ART intervention are known as a cycle of treatment. Treatment with an ART intervention involves multiple steps over a period of 2 weeks. The cycle begins when a woman starts taking medication to stimulate egg production or when she begins monitoring her ovaries for natural egg production. The next phase involves retrieval of the eggs and, for IVF and ZIFT, fertilization of the egg with sperm. The step after is placement, which varies depending upon the type of ART intervention used. Following this phase, the woman is monitored for pregnancy.

Other treatments for infertility that are not included within the umbrella of ART include intrauterine insemination and procedures that involve medication use to stimulate egg production without intended retrieval of the eggs (CDC, 2011). Intrauterine insemination (IUI) involves placing sperm with a catheter into the woman's uterus while she is ovulating (RESOLVE, 2012a). It is typically used for couples with unexplained

infertility, with women who have cervical mucus problems, and for minimal male factor infertility. The female partner often takes ovulation-stimulating drugs in conjunction with this treatment. Overall, the majority of treatment is undergone by the female partner attempting pregnancy.

Data and Success Rates

Based upon the 2009 Assisted Reproductive Technology Report there were 146,244 ART cycles performed in the 441 clinics that provided data (CDC, 2011). From these cycles, there were 45,870 live births (multiple infants at one delivery is considered one live birth). Approximately 30% of cycles started were successful. Many factors influence the success of ART cycles including the partners' ages and the cause of infertility. Of those cycles that attained pregnancy, about 82% led to a live birth. Approximately 70% of ART cycles were performed with fresh, nondonor eggs, while 18% used frozen nondonor eggs or embryos. Donor eggs or embryos were used in about 12% of the cycles started. The average age for women receiving ART intervention was 36. Women ages 35 and younger accounted for 39% of ART cycles, 20% were performed on women ages 35-37, 21% on women ages 38-40, 10% on women ages 41-42, 6% on women ages 43-44, and 5% on women older than 44 years of age.

Type of procedure performed in the 2009 cycles varied according to age of the woman undergoing treatment. Approximately 97% of women younger than 35 used their own eggs in ART treatment while 36% of women aged 43-44, and 73% of women older than 44 used donor eggs (CDC, 2011). It is more common in treatment to use fresh eggs and embryos rather than frozen embryos. Additionally, success rates for ART cycles

varied by age of the woman. For women age 40 using fresh, nondonor eggs or embryos in 2009, 27% resulted in pregnancy and 19% in live birth. These numbers steadily decrease with each additional year in age for women. By age 44, live births are achieved in less than 2% of the cycles started. Even when pregnancy is achieved, women's age is a predictive factor for miscarriage in the ART cycle. Women younger than 35 have miscarriage in approximately 13% of art cycles using fresh, nondonor eggs, while women age 40 have miscarriage in 28% of cycles and women older than 44 in 59% of cycles. Success is greater when donor eggs are used. Overall, 55% of transfers from fresh donor eggs result in live birth. This percentage is fairly stable across age groups.

Access to Treatment

Despite the modern technologies available to assist those experiencing infertility, many women do not appear to utilize the services (Stephen & Chandra, 2000). For those who do, the services tend to be noninvasive treatments that may not maximize a woman's ability to conceive. Infertility is unique from many medical conditions in that the costs of treatment are primarily the burden of the patient regardless of insurance status (Kissil & Davey, 2012). As of 2007, only 25% of health insurance plans covered infertility treatments (Schmidt, 2007). According to Kissil and Davey (2012), the average cost for a single cycle of IVF is \$10,000-\$25,000. Many states do not mandate that infertility treatment be included in health insurance plans. However, an increasing number of states are requiring insurance companies offer some sort of coverage for additional purchase by individuals. However, this may exclude IVF treatment, which is one of the most expensive and successful forms of infertility treatment. Currently, only Arkansas,

Connecticut, Hawaii, Illinois, Massachusetts, Maryland, New Jersey, and Rhode Island have IVF mandates (RESOLVE, 2014). The implementation of the Affordable Care Act has not changed access to infertility treatments across states, but previously uninsured individuals residing in states with mandates may now find themselves with access. Considering the limited number of health care plans with coverage for fertility treatment, there is discrimination in access to such care.

When examining access to treatment, women of lower socioeconomic status (SES) cite multiple barriers to accessing fertility treatment, including financial and structural impediments (A. Bell, 2009). For example, in a qualitative study, one patient described difficulty with leaving work to attend multiple medical appointments, as well as an inability to afford the accumulating cost of copays for multiple visits. Communication between medical staff and patients was also an identified barrier, as women of lower SES reported issues of discrimination by their physicians. Given the nature of infertility coverage by health insurance, the typical patient is going to be someone with the financial means to afford treatment. Greil, McQuillan, Shreffler, Johnson, and Slauson-Blevins (2011b) examined individual and social cues, enabling factors, and predisposing factors for infertility treatment seeking among racial and ethnic groups experiencing infertility. Hispanic/Latina and Black/African-American women were less likely to seek treatment, which was partially mediated by enabling conditions of income, education, and private insurance. However, important social and individual cues also played a role, including less intentionality in becoming pregnant, ethical concerns about fertility treatments, less perceived social support to seek treatment, and less value placed on motherhood as an identity. Marital status and sexual orientation may also

present barriers to accessing treatment, as ART clinics may refuse to provide services to unmarried individuals with or without partners (Kissil & Davey, 2012). Additionally, some states have legislation that limits gestational services to heterosexual, married couples. Additionally, many fertility clinic websites do not display explicit information on their websites regarding non-discriminatory statements (Johnson, 2012). Though access to treatment may not be the only factor contributing to treatment-seeking among infertile patients, changes in insurance coverage could increase utilization of these services. Utilization rates for IVF treatment increased by 192% in Quebec, Canada from 2009 to 2011 after policy was implemented that provided public funding for coverage of IVF treatment (Vélez, Connolly, Kadoch, Phillips, & Bissonnette, 2014). Additionally, a study of ART utilization in active duty U.S. military personnel who have access to affordable fertility treatment through the U.S. federal healthcare system, showed increased treatment usage among Black/African-American and Hispanic women compared to civilian rates in these populations (McCarthy-Keith et al., 2010). Despite increased usage overall, rates were still significantly lower amongst minority groups compared to Caucasians. As it currently stands, infertility treatment is sought primarily by women and couples who are Caucasian, well-educated, affluent, and somewhat older (Schmidt; 2007).

Stress, Distress, and Infertility

As previously discussed, psychological distress and stress are additional factors that appear to impact fertility for men (Clark, Lock, Geoghegan, & Travassos, 1999; Pook et al.; 1999; Pook et al., 2004), and women (Lynch et al., 2014). The psychological

experience of infertility and subsequent treatment can be a particularly distressing life event for individuals and couples. This impact occurs not only while people attempt pregnancy on their own but also throughout the infertility diagnostic process, during fertility treatment, and in dealing with treatment outcome. While there appears to be an association between psychological distress, stress, and infertility, it is difficult to determine the directionality of the relationship between infertility and distress. There are few prospective studies examining this relationship due to difficulty identifying those at risk for infertility (Lynch et al., 2014; Turner et al., 2013). This presents a challenge in properly assisting patients with psychological distress due to infertility. Additionally, it is important to identify how infertility and its treatment impact people at an individual, couple, and social level. Identifying those at risk and understanding the infertility experience will allow mental health providers to tailor interventions to better meet the psychological needs of this population.

Women's Response to Infertility

While the impact of psychological distress and stress on the physical outcomes of fertility treatment remains unclear, there are a number of negative psychological consequences women face due to infertility-related distress. According to Lykeridou et al.'s (2009) review of the literature, infertility was rated as the fourth most distressing life experience for women. The authors found that infertility increased stress levels for women, and was associated with feelings of grief, depression, guilt, and anxiety. McQuillan, Greil, White, and Jacob (2003) found in their study that women who experienced infertility and involuntary childlessness endorsed significantly higher

distress levels when compared to others, such as those with fertility problems who eventually had children. When compared to fertile women, distress in infertile women is significantly higher and subjective well-being is poorer (Domar, Broome, Joshi, Singh, & Bindu, 2009; Zuttermeister, Seibel, & Friedman, 1992). However, some research suggests that women experiencing infertility are comparable, if not psychologically healthier, than normative populations (Lewis, Liu, Stuart, & Ryan, 2013). Distress levels may depend on the phase of treatment and length of infertility.

When examining gender differences, women report higher levels of infertility distress than their male partners (Anderson, Sharpe, Rattray, & Irvine, 2003; Newton, Sherrard, Glavac, 1999). Galhardo, Cunha, Pinto-Gouveia, and Matos (2013) found that women not only reported higher infertility distress than men and fertile female controls, but they also endorsed greater feelings of shame and self-judgment. They endorsed less self-compassion than men and fertile female controls as well. In a study by Johnson and Fledderjohann (2012), U.S. women were studied to determine the relationship between infertility diagnosis, treatment type, distress levels, and self-identification as infertile. Results showed that women who were medically diagnosed as infertile were more likely to self-identify as infertile. Women seeking treatment for male factor infertility were less likely to identify as infertile. Women who identified as infertile endorsed higher levels of distress. Self-identification as infertile, as opposed to type of infertility diagnosis was directly related to distress levels. Interestingly, Teskereci and Oncel (2013) found that Turkish women receiving ART reported poorer mental health (e.g. feelings of nervousness and depression) when coping with a male-factor infertility diagnosis. Undergoing treatment was directly associated with higher levels of distress as were

women's attitudes regarding the importance of parenthood. McQuillan, Jacob, and Greil (2011) found women who were infertile and had intent to have children were significantly more likely to self-identify as infertile, seek medical treatment, and had higher distress levels compared to infertile women without intent to have children. Additionally, in a primary care sample, women who endorsed conception difficulties and found this distressing reported higher levels of depressive and anxiety symptoms on the Patient Health Questionnaire (Jordan & Ferguson, 2006). In a qualitative study by K. Bell (2013), many women endorsed a sense of guilt that they were not able to become pregnant, regardless of the infertility etiology.

The importance of parenthood and intent to have children appears to have a strong connection to distress for women experiencing infertility (Jacob, McQuillan, & Greil., 2007; Johnson & Fledderjohann, 2012). The qualitative study by K. Bell (2013) revealed that involuntary childlessness was one of the most significant life crises respondents had experienced. Experiencing infertility led to feelings of disempowerment to bring about a life wish. Brothers and Maddux (2003) studied how strongly women who were experiencing difficulty conceiving linked their happiness to parenthood. They found that women who perceived their happiness as tied to parenthood more strongly, reported higher distress levels; however, this effect was mediated by rumination. Women were more likely to ruminate about attaining pregnancy when they believed parenthood was strongly linked to their happiness, and this rumination was predictive of higher distress levels. This study did not examine the role that active treatment played in distress levels. It may be possible that women who seek treatment rate parenthood as more important in their lives and may be more prone to rumination due to the salience treatment creates

regarding the infertility. Women's views of parenthood and other life goals may come to a halt when faced with infertility. Life goals appear to play an important role in psychological well-being for women experiencing infertility (Thompson et al., 2011). That is to say, women who are able to adjust their goals when life obstacles arise demonstrate better psychological adjustment. Thompson et al. (2011) found that women who were able to disengage with their goal of biological parenthood demonstrated fewer infertility-related thought intrusions. Engagement with other life goals was associated with fewer depressive symptoms. It may be beneficial for mental health professionals to help couples focus on increasing flexibility regarding their life goals to reduce distress levels.

In addition to the distress women may experience in struggling to reach life goals due to infertility, they may also struggle with the expectations and opinions friends and families place upon them regarding their childlessness. Research suggest that women's appraisal of the infertility, social pressure, and their gender role identity appear to play a role in experienced levels of infertility-specific distress (Miles, Keitel, Jackson, Harris, & Licciardi, 2009). That is to say, women who experienced more social pressure for motherhood and appraised the infertility as stressful experienced greater distress. Distress may also reflect women's association with their gender roles. Women's inability to have children, which can be viewed as a failure to reach a life goal and significant life transition, impacts their social relationships (Loftus & Andriot, 2012). Participants in the study by Loftus and Andriot (2012) endorsed depression over the loss of their identities as women due to childlessness, which led them to feel inauthentic and inadequate around women with children. A study of postmenopausal women who remained childlessness

revealed that participants struggled with the insensitivity of others as they dealt with infertility, and they experiences a sense of non-participation being around others who had biological children (Ferland & Caron, 2013).

In addition to the burden infertility may cause in social relationships, the process of receiving infertility treatment may also contribute to infertility-related distress. One important consideration when examining infertility-related distress in women is that, regardless of the etiology of the infertility, they are considered the “patient” during treatment, (K. Bell, 2013; Benyamini et al., 2008). A longitudinal, cohort study by Greil et al. (2011a) examined infertile women who experienced infertility during two points in time. The authors compared distress levels between women who received treatment and those who did not at the different phases of the study. Women who did not receive treatment and had no live birth at time 1 reported lower distress levels than women who received treatment at time 1 regardless of outcome (i.e. pregnancy or no pregnancy). Women who received no infertility treatment at time 2 reported lower distress than women who received treatment at time 2 or during both time points, regardless of outcome. For women who did not receive treatment at either wave, infertility-related distress did not increase over time. Infertility-related distress was higher for women who received treatment at both time points when not followed by a live birth compared to women who received no treatment or only treatment at time 1. This suggests that infertility-related distress is associated with time in treatment as opposed to the infertile state. This may be partly attributable to varying views on parenthood (Johnson & Fledderjohann, 2012). Those who care more to be a parent may pursue treatment for longer. McQuillan et al. (2003) came to different conclusions, finding involuntary

childlessness and infertility difficulties predicted significantly higher distress levels regardless of treatment seeking.

Women's Coping with Infertility

Given that infertility is rated by women as one of the most stressful life events they have experienced (K. Bell, 2013; Lykeridou et al., 2009) and contributes to increased distress (Joshi et al., 2009; Mcquillan et al., 2003), it is important to consider how women cope with this life experience. Benyamini et al. (2008) developed a 51-item measure, the Coping with Infertility Questionnaire, to assess styles of coping related to the infertility experience. Items were derived from qualitative interviews as well as a review of existing literature on coping with stressful situations. Three main coping areas were revealed from their study and each is composed of more specific coping styles. The approach-avoidance dimension of coping includes aspects of social withdrawal, denial, self-blame, self-neglect, disclosure, acceptance, and positive re-interpretation. Relationship coping includes seeking spousal support. Practical management includes self-nurturing, seeking social support, planning and information-seeking, and faith. This study also compared coping with psychological adjustment, which was assessed through measures of well-being, distress, life satisfaction, and somatic symptoms. Results showed that emotional approach coping such as self-nurturing, and problem appraisal strategies such as positive reinterpretation were associated with better psychological adjustment. On the other hand, emotional avoidance, and problem-management strategies such as seeking social support and information-seeking were associated with worse adjustment. In contrast, La Joie (2003) found that strong social support, including marital support,

was associated with lower distress levels. A study by Adams (2002) showed that women experiencing primary or secondary infertility typically used social support, problem solving, and positive reappraisal in coping with distress. They were less likely to use avoidance, self-controlling, distancing, accepting responsibility, and confrontive coping (aggressive efforts to resolve the situation). For those experiencing primary infertility, accepting responsibility and avoidance were associated with increased levels of distress. Type of coping may also vary across treatment stage. Women were most likely to use seeking social support and escape avoidance across all treatment stages (Gerrity, 2001). Self-control was also commonly used, though women no longer undergoing treatment were less likely to use this coping technique. Persisters (i.e. those with five or more years of unsuccessful medical interventions) were more likely to use accepting responsibility than those who had concluded infertility treatment.

Qualitative research by Loftus and Andriot (2012) revealed that female respondents reported they coped with the social aspect of infertility by avoiding others, and through negative self-appraisals. Given this is a qualitative study, it is unclear how well these responses reflect the larger population of women experiencing infertility, but results suggest an association between distress and coping through avoidance and negative appraisals. K. Bell (2013) also found in her qualitative research that women expressed a tendency to avoid and withdraw to cope with social concerns. A study by Sexton, Byrd, and Kluge (2009) revealed that women experiencing infertility demonstrated lower resilience than normal populations and that lower resilience was associated with higher levels of infertility-related and general distress. (Sexton, Byrd, & Kluge, 2009). Galhardo et al. (2013) found that for women, self-compassion mediated the

impact of internal shame and partially mediated the impact of marital adjustment on infertility-related distress. Additionally, women's assessments of how others view them, defined as external shame, was directly associated with infertility stress.

Men's Response to Infertility

Understanding the impact of the infertility experience on male partners is more challenging given the limited research available, particularly in comparison to research examining infertility and distress in women. When examining the relationship between infertility and distress for men, it is important to consider the role the type of infertility diagnosis may have upon the male partner. It is often thought that men report higher distress levels when infertility is a result of male-factor rather than female-factor or mixed-factor. In a study by Peronace, Boivin, and Schmidt (2007) male partners of infertile couples were assessed for physical health, and psychological and social stress prior to and 12 months after unsuccessful infertility treatment. Results revealed no differences in stress levels or health for men based upon infertility diagnosis. Rather, unsuccessful treatment outcome was associated with decreased mental health, and increased physical stress and social stress. This suggests that involuntary childlessness negatively impacts men regardless of the type of infertility diagnosis they experience. These results are similar to findings from Holter, Anderheim, Bergh, and Möller (2007) who found no differences in psychological well-being (e.g. anxiety, depressed mood, general health) between male participants seeking treatment due to male-factor, versus female, mixed, or unknown factor infertility. Other literature reveals that men with male-factor infertility report poorer sexual and personal quality of life than men dealing with

female, unknown, or combined-factor infertility (Smith et al., 2009). In contrast, Pook and Krause (2005) found that distress levels did not vary for men over time, regardless of treatment utilization or type of infertility diagnosis. They found increased levels of distress over time for men who experienced an unsuccessful ART cycle. A study of South African infertile men found higher distress levels compared to men with pregnant wives; however, reported distress was still within a normal range. Men initially undergoing their first infertility diagnostic workup may experience decreased stress between pre-workup and post-workup (Pook, Krause, & Drescher, 2002). The authors suggested that the decrease in stress for participants receiving their first workup may reflect utilization of active coping techniques.

Research has also examined the relationship between depression, anxiety, and infertility among men. Band, Edelman, Avery, and Brinsden (1998) found elevated levels of depression and state anxiety (i.e. anxiety about a particular event) among some men with male-factor infertility. Depression levels were predicted by an anxious disposition, a tendency to appraise situations as stressful, and an avoidance coping style, while state anxiety was predicted by trait anxiety (i.e. a general tendency to feel anxious) and failure to seek social support. Shindel, Nelson, Naughton, Ohebshalom, and Mulhall (2008) found that among infertile couples, 11% of men endorsed moderate depressive symptoms and 12% endorsed severe depressive symptoms. Smith et al. (2009) found male-factor infertility was independently associated with worse scores on measures of sexual and personal impact. That is to say, men felt less control over their lives, less able to meet goals, and more responsible for the fertility problems. They also reported less sexual satisfaction and more feelings of sexual failure. Hammarberg, Baker, and Fisher

(2010) also found that 25% men reported their male-factor infertility contributed to relationship difficulties and 32% reported decreased sexual satisfaction. Interestingly, a similar proportion, 36%, reported positive effects of infertility on their relationship and 20% reported improved sexual satisfaction. A study by Peterson et al. (2007b) revealed that male partners of infertile couples experienced increased sexual stress related to the infertility diagnosis.

Social construction of male fertility may impact men dealing with infertility concerns. Gannon, Glover, and Abel (2004) found that newspaper articles discussing a national decline in sperm count presented infertility as a state of crisis for men and likened male infertility to impotence. Male-factor infertility may be associated with feelings of guilt due to an inability to prove their manhood (Edelmann, Humphrey, & Owens, 1994b). In a qualitative analysis of male-factor infertility and the experiences of men attending fertility treatment, three major themes emerged: impact to self, social impact, and relationship and support (Dooley et al., 2011). Men expressed having to present as strong during the treatment and relinquish control. Their role was primarily supportive of their partners. They were unlikely to disclose their male-factor infertility to others. Narratives from Chilean men who experienced infertility show similar themes with their primary role as providing support for their female partners (Herrera, 2013). It appeared that men also struggled with legitimizing their infertility experience because the female partner undergoes the majority of the fertility treatment.

Current research suggests that men and women differ in their response to the infertility experience. In one study measuring distress levels in both partners, men reported fewer sources of stress than women did and experienced this stress at less

intense levels (Boivin & Schmidt, 2005). In a study by Morrow, Thoreson, and Penney (1995) increased age and having no biological children was predictive of higher distress levels in men experiencing infertility but not for women. This is a particularly important consideration, as infertility-related distress may impact the quality of sperm for men experiencing male-factor infertility. Pook et al. (1999) found that men with high infertility-related distress had a decrease in sperm quality. Additionally, 47.7% of the decreased sperm concentration was attributable to high infertility-related distress. Pook et al. (2004) as well as Clark et al. (1999) found a relationship between infertility-related distress and poorer sperm quality. The latter study found that men undergoing IVF treatment for the first time demonstrated decreased sperm quality when they reported poorer psychological health.

Men's Coping with Infertility

While psychological distress appears to directly impact fertility in men (Pook et al., 1999; Pook et al., 2004), little is known about male partners' experiences of infertility treatment, their support needs, or their decisions to end treatment (Culley et al., 2013). In addition, it appears there is little research on how men cope with the infertility, perhaps because the majority of fertility treatment occurs to the female partner (K. Bell, 2013; Benyamini et al., 2008), placing men in a secondary role (Herrera, 2013). A study of Dutch men found that men of higher social class, as determined by education, vocational training, and occupation, were more likely to use active-avoidance coping than men of middle or lower social class (Schmidt, Christensen, & Holstein, 2005a). Active-avoidance coping is defined by avoiding conversations and situations that involved

reminders of fertility. Additionally, a return to work or other distraction based strategies were included as active-avoidance coping. Men of lower social class were most likely to use passive-avoidance coping, such as hoping for a miracle, and meaning-based coping, such as finding other goals in life. The authors suggested that ways of coping may be learned from social networks and reference groups. Avoidance coping is associated with higher distress levels in men, as is failure to seek social support (Band et al., 1998).

Stanton, Tennen, Affleck, Mendola (1992) explored differences in coping with infertility between men and women. They found that men were more likely to use distancing, planful problem-solving, and self-control to cope with infertility than female partners. Men were most likely to use seeking social support as a coping response, though to a lesser degree than women. Seeking social support, distancing and planful problem solving were correlated to lower infertility-related distress, while self-control was correlated to increased infertility-related distress. Avoidance coping and self-blame were also associated with higher distress levels. Overall, men used fewer coping strategies. It is interesting that men identified seeking social support as their primary coping response as Dooley et al. (2011) found that men were unlikely to disclose issues around infertility. This difference may reflect men discussing fertility issues on a practical level with friends and health-professionals but withholding details regarding the emotional and personal impact of this experience. Slade et al. (2007) found that, for men, higher perceived stigma around the infertility was associated with lower disclosure, lower perceived social support, and higher fertility and general distress levels. Disclosure was not associated with distress levels. Disclosure was also not associated with perceived social support, perhaps because the study did not directly measure perceived support

regarding the infertility difficulties. It is also possible that men do not need to disclose to feel supported by others.

While men appear to use fewer coping strategies than women (Stanton et al., 1992), research comparing coping utilization between fertile and sub-fertile men showed higher utilization of coping strategies among sub-fertile males (Hurst, Dye, Rutherford, & Oodit, 1999). Coping strategies include efforts to control the situation, efforts to control reactions, relaxation, search for self-affirmation, intrusive thoughts, disparagement, avoidance, and escape. The groups did not differ in terms of perceived stress, likely because the sub-fertile group utilized more coping to manage stress levels.

The Impact of Infertility on the Couple

The impact infertility has upon the couple is an important area of consideration, given that significant others are identified as the primary source of support for infertile couples (Hammarberg et al., 2010). Additionally, Pasch et al. (2002) emphasized the point that infertility is an issue for the couple attempting pregnancy, regardless of etiology. Benyamini et al. (2009) examined couples' perceptions of infertility and how these perceptions impacted distress levels. Highest distress was found in women who perceived low controllability of the fertility problem and whose partners perceived high controllability. This discrepancy between men and women's beliefs in their ability to control issues around the infertility may lead women to see their partners' optimism as insensitive to their own feelings of low control. Pasch et al. (2002) found men expressed more negative affect when they had low involvement in trying to have a baby but their wives were highly involved. Martins et al. (2014) found that infertility-related distress

was associated with low partner support. In men, distress also varied when their partners reported low partner or familial support. It appears that men feel more distressed when their female partners perceive them as less supportive, which is an important consideration for psychological treatment. Additionally, men's perceptions of their partner as less caring, sensitive, and affectionate, and more critical, dominant, and intimidating, rated infertility as having a more negative effect on their relationship with their partner (Hammarberg et al., 2010). It also appears that husbands' approach to infertility, such as level of involvement in trying to conceive and importance of having children, was associated with the how much wives report the infertility impacts their marriage. A study by Peterson, Newton, Rosen, and Skaggs (2006c) on coping behaviors in men and women referred for infertility services, showed that women used greater amounts of confrontative coping, seeking social support from others, accepting responsibility, and escape avoidance coping. Men used more distancing, self-controlling, planning, and problem solving. Coping strategies that are beneficial for the individual may lead to problems for the partner. In particular, there appears to be higher distress levels in couples where men use high amounts of distancing and women use low amounts of distancing (Peterson, Newton, Rosen, & Schulmann, 2006a). Peterson et al., (2006c) found marital satisfaction diminished when men or women used escape/avoidance and accepting responsibility. In contrast, seeking social support, planful problem-solving, and distancing (making light of the infertility) were positively associated with marital satisfaction.

Some couples even report marital benefit secondary to the infertility such as a strengthened relationship and feeling closer to each other (Schmidt et al., 2005b).

Hammarberg et al. (2010) found that 36% of men reported positive effects of infertility on their relationship, and 20% reported improved sexual satisfaction. Additionally, Schmidt et al. (2005b) found that 26% of women and 21% of men felt infertility had marital benefit. This is consistent with results from Pasch et al. (2002) who found that generally speaking, couples rated the effect of infertility on their marriage as somewhat positive. Better marital adjustment is present in couples who report equal amounts of socially related infertility stress, suggesting that agreement between partners helps them to better manage the infertility (Peterson, Newton, & Rosen, 2003). Research shows that men who view their female partner as supportive indicated they were better able to give and receive support from others, including professional support (Dooley et al., 2011). This emphasizes the importance of the dyadic nature of the infertility experience. Understanding the potential benefits of infertility may help couples to more effectively cope with this stressful life experience.

Given the nature of infertility, one area that becomes a concern for couples is their sexual quality of life. Male partners in couples with male factor infertility report lower personal and sexual quality of life (Smith et al., 2009). Additionally, female partners of infertile couples report depression and sexual dysfunction, which is associated with poorer male sexual functioning (Nelson, Shindel, Naughton, Ohebshalom, & Mulhall, 2008). Male factor infertility, as well as an extended duration of infertility (3-6 years), was correlated with higher relationship instability and lower sexual satisfaction for both men and women (Drosdzol & Shrzypulec, 2009). In contrast, female infertility was rated as more likely to impact the couple's sexual relationship for male participants, while female participants rated male-factor and female-factor infertility as more impactful on

the quality of their sexual relationship (Edelmann, Connolly, & Bartlett, 1994a). A review of the literature by Ferraresi, Lara, de Sá, Reis, and Silva (2013) found that infertility was associated with higher sexual dysfunction in men and women compared to fertile men and women. Other risk factors for greater sexual dysfunction included being female, lower education level, and over 30 years old. Wischmann (2010) found sexual disorders secondary to diagnosis and treatment of infertility are common in couples, particularly for the female partners. Areas of female sexual dysfunction included difficulty feeling aroused and attaining orgasm (Khademi, Alleyassain, Amini, & Ghaemi, 2008). Dealing with infertility causes a loss of privacy regarding the couple's sexual life and often leads to engaging in sexual intercourse for the purpose of reproduction and not for pleasure (Onat & Beji, 2012). However, some studies have found higher sexual satisfaction among men engaged in ART (Repokari et al., 2007).

Failure of infertility treatment and extended periods seeking treatment may lead to marital strain over time (Drosdzol & Shrzypulec, 2009; Peronance et al., 2007). Sina et al. (2010) found that couples who experienced longer periods of infertility treatment demonstrated higher levels depression. However, this appeared to be completely moderated by the partners' emotional frailty (e.g. tendency to feel inadequate). They also found higher dyadic adjustment (cohesion, consensus, and marital satisfaction) in couples with longer periods of infertility but who had not sought treatment compared to those with extended infertility who sought treatment earlier on. This suggests that treatment duration may negatively impact couples that have experienced longer periods of infertility. Marital happiness appears to differ depending on treatment stage, with those

beginning treatment significantly more happy with their marriages than those with persistent infertility (Gerrity, 2001).

As mentioned earlier, there are many steps involved in a single cycle of ART treatment (CDC, 2011). For couples undergoing fertility treatment, different concerns may arise depending on where in they are in the treatment process (Stark, Keathley, & Nelson, 2011). This includes challenges in managing their social life such as dealing with stigmatization and questions regarding their childlessness (Onat & Beji, 2012). Wilkes, Hall, Crosland, Murdoch, and Rubin (2009) found in their qualitative research that couples may struggle with social implications of informing friends and family, which contributed to avoidance of social settings. Financial costs, interruptions to work life, and worsening family relationships are other considerations in addition to the previously discussed sexual quality of life issues and importance of parenthood. These effects may vary depending on gender, the quality of the relationship, and the stage of treatment. Culture is also an important factor to consider when understanding the infertility experience for couples. Varying cultural views of parenthood may impact the individual and couples' interpretation of what infertility means for their relationship (Lykeridou et al., 2009; Teskereci & Oncel, 2013; Van Rooij, Van Balen, & Hermans, 2007). The numerous issues individuals and couples face through the various stages of infertility diagnosis and treatment present multiple areas to address through psychological intervention.

Evidence-Based Psychological Treatment of Infertility

Given that infertility is a condition that impacts women and men on social, personal, and medical domains, causes distress, and activates utilization of effective and ineffective coping resources to manage this distress, the question then follows how psychologists and other mental health professionals can assist patients in managing this stressful life event. One study examining screening practices of 369 U.S. ART Programs found that 89% of programs collect information on patients' mental health but only 18% had patients meet with a social worker or psychologist during evaluation (Gurmankin, Caplan, & Braverman, 2005). Machin (2011) found that infertility counseling was a required step for couples receiving donated embryos but not for couples receiving IVF. Study participants receiving IVF commented on the inaccessibility of infertility counseling and the discomfort they felt in asking for this service. Additionally, participants who worked in the clinics were not aware of the difficulties people may face after they complete their IVF cycle, such as informing friends and family of their treatment. Individuals who received infertility counseling after finishing IVF saw this as supportive, even though their medical treatment was complete. This has important implications for what psychologists may offer in terms of improving patient perceptions of how supported they feel by the treatment team. A national survey studying the experiences of couples receiving fertility treatment in the United Kingdom (UK) found that 70% of respondents would consider counseling services and 30% had received counseling (Kerr, Brown, & Balen, 1999). Rajkhowa et al. (2006) found that 20% of participants in their study saw a counselor during IVF treatment even though this service was offered to everyone. However, 33% of respondents did not recall being offered the

service and a vast majority of these individuals felt it should have been offered.

Experiencing failure in infertility treatment cycles appears to increase couples likelihood to pursue psychological support (Sina et al., 2010). Psychological services may help to alleviate the psychological burden that has cited as reason for treatment dropout (Olivius et al., 2004; Rajkhowa et al., 2006).

Additionally important is the consideration of patient-identified needs as they navigate the diagnostic process, undergo infertility treatment, and deal with the outcomes of treatment. One study found that 9% of men who experienced a failed ART cycle had contact with a psychologist or other mental health professional (Holter et al., 2007). Additionally, of those men who experienced a failed ART cycle but had no contact with a psychologist, 23% with male-factor infertility and 33% with other-factor infertility thought contact with a psychologist would be valuable. Laffont and Edelmann (1994) also found that men and women reported that support after a failed IVF cycle would be important, and women with poorer well-being were more likely to express interest in seeing a counselor. In a study by Boivin, Scanlan, & Walker (1999), 80% of female patients who were quantified as highly distressed felt psychological services would be helpful, but identified practical reasons (e.g. knowing who to contact, cost) as the primary barrier to accessing counseling. Read et al. (2013) conducted a qualitative study eliciting patient-identified psychosocial needs and the types of help they wanted during infertility treatment. Participants expressed needs around discussing the impact infertility had on the relationship, and also help in coping with the emotional and physical stress that occurs during treatment. Some study participants sought psychological counseling for these very reasons and expressed satisfaction at the services they received. A desire for

practical information about treatment and to connect with others in the same situation were additional needs couples felt were missing. The majority of patients did not feel they required professional services by a psychologist, but this may reflect stigma around mental health in conjunction with the stigma of infertility. Patients expressed most interest in working with a peer mentor—someone who had undergone fertility treatment and could provide practical and emotional support to patients receiving treatment.

Overview of Psychological Interventions

Despite the numerous areas to address through psychotherapeutic interventions for individuals and couples experiencing infertility, there is limited research examining the efficacy of specific treatments. Boivin (2003) conducted an examination of literature on psychosocial interventions for infertility, including psycho-analytic, psychodynamic, cognitive-behavioral therapy, information-giving, autogenic, coping skills focused, and stress reduction training. The results showed interventions were more effective in reducing negative emotions than in changing fixed traits such as interpersonal functioning. Emphasis on education and skills training appeared to be more effective in producing positive outcomes compared to interventions highlighting emotional expression, support, and discussions related to infertility. Gender differences were not observed regarding effectiveness of interventions. Interventions were most effective when they lasted approximately 6-12 weeks.

Cognitive and Behavioral Therapies

Much of the outcome research on therapeutic interventions for people experiencing infertility is on cognitive or cognitive behavioral therapy (CBT). Research has shown that the type of cognitive coping strategies, including self-blame, rumination, and catastrophizing, that individuals use to handle infertility-related distress is directly associated with depressive symptoms (Kraaij, Garnefski, Schoevers, Weijmer, & Helmerhorst, 2010; Kraaij, Garnefski, & Vlietstra, 2008). Focusing on cognitive coping skills to implement more positive coping may greatly improve infertility-related distress for individuals experiencing infertility.

Domar et al. (2000) found that the utilization of CBT in a 10-session group therapy program produced the greatest psychological improvement compared to supportive therapy group and the control group. Significant improvements were also seen in the support group. Faramarzi et al. (2008) explored the benefits of the antidepressant fluoxetine versus CBT for infertile women experiencing depression. Resolution of depressive symptoms occurred in 79.3% of CBT group participants, 50% of those taking fluoxetine, and 10% of controls. The CBT group also showed a greater reduction in anxiety after treatment compared to the fluoxetine and control group. Faramarzi et al. (2013) found in an additional study examining the effectiveness of CBT compared to antidepressant use among women with minimal to moderate depression that women in the CBT group showed the greatest improvement across five main fertility problem areas (e.g. social concerns, rejection of childfree lifestyle) compared to the antidepressant group and controls, though both the CBT and antidepressant group saw reduction in depression.

Cognitive behavioral therapy can also benefit the relationship of couples seeking infertility treatment. Tuschen-Caffier, Florin, Krause, and Pook (1999) studied the impact of a cognitive-behavioral therapy program for couples designed to optimize chance of conception, improve sexual functioning and satisfaction, improve communication between couples, and relieve thoughts of helplessness. For couples in the treatment condition, follow up measures showed increased sperm concentration, reduced thoughts of helplessness, and lower marital distress. Additionally, the therapy group practiced timed intercourse more reliably to improve chances of achieving pregnancy. They did not endorse reductions in sexual pleasure or satisfaction. It is thought that couples who engage in timed intercourse experience decreased sexual pleasure and satisfaction because sex is no longer oriented around pleasure. Altering dysfunctional thoughts that arise from dealing with infertility may improve the quality of couples' relationships. In addition to improving the marital relationship, cognitive-behavioral therapy may help to manage physiological responses to distress. After a 12 group session cognitive-behavioral intervention, women waiting for in vitro fertilization and embryo transfer showed reduced stress levels (heart rate and systolic blood pressure) when presented with a stress condition.

Another form of treatment that may be beneficial with people experiencing infertility is Acceptance and Commitment Therapy, which addresses avoidance coping through implementation of techniques meant to build non-judgmental self-awareness, acceptance, and living out one's values (Peterson & Eifert, 2011). The researchers followed the progress of a couple experiencing infertility through treatment with Acceptance and Commitment Therapy. The female partner endorsed less distress at one-

year follow-up, while the male partner showed a decrease in sexual infertility-related stress. Further research is necessary to better understand the effectiveness of this intervention on infertility stress, though the goals of Acceptance and Commitment Therapy may effectively address major concerns for individuals experiencing infertility, such as the value they place on parenthood (Lykeridou et al., 2009; Van Rooijet al., 2007).

As discussed earlier, there are numerous risk factors for infertility, one of them being overweight and underweight (RESOLVE, 2012b). Psychologists may assist women experiencing infertility by addressing behavioral factors that are known to contribute to infertility difficulties. A 24-week group treatment program for obese, infertile women, showed that participants achieved weight loss and improvements in self-esteem, anxiety, depression, and general health by the end of the intervention (Galletly, Clark, Tomlinson, & Blaney, 1996). At follow up, the majority of participants had conceived. The program sought to address eating patterns, educate about the relationship between weight and fertility, and build coping tools to handle psychological distress related to infertility. Psychologists and other mental health professionals may help address the psychological barriers to behavior changes and help couples to maximize their potential to conceive.

Psychoeducational Interventions

Individuals' coping styles appear to have a major impact on their experience of infertility distress and may contribute to symptoms of depression and anxiety (Kraaij et al., 2010; Kraaij et al., 2008). Building healthy coping skills, effective stress management, and improving communication appears to increase the level of perceived

social support among infertile couples (Schmidt, Tjørnhøj-Thomsen, Boivin, & Nyboe Andersen, 2005c). Schmidt et al. (2005c) found that couples who underwent a stress management and communication skills building program spoke more often with each other and others regarding their infertility, and were more likely to contact support groups or other psychological services. Women also reported marital benefit. In a study designed to examine outcomes of a problem-focused versus emotion-focused coping skills treatment program, infertile females in the problem-focused group showed greater well-being after the six week intervention (McQueeney, Stanton, & Sigmon, 1997). At one month follow-up, the emotion focused group showed greatest gains in well-being. By 18 months, the problem-focused group demonstrated the greatest well-being though both groups had continued improvement. Emotion-focused treatment is designed to assist in regulating affect while problem focused seeks to increase perceived control over the infertility by building assertive communication skills with medical professionals and helping with infertility-related problem solving strategies.

Online Interventions

The internet has become a forum for psychosocial interventions to be delivered to many individuals in an accessible way. The results of one study showed 81% of couples with infertility use the internet and 54% use it for fertility-related problems (Haagen et al., 2003). Females were more likely to use the internet for fertility-related problems. Slauson-Blevins, McQuillan, and Greil (2013) found that, for women, help-seeking on the Internet appears to be primarily used in supplement of seeking help from medical professionals, but the authors anticipated increased usage of the internet over time.

Online interventions allow for individuals who struggle with the stigma of infertility to seek help while also remaining anonymous. It is also more readily available to persons who live far from treatment facilities.

Participants in online support group report multiple benefits from this format of intervention, including improved relationship with their partner, reduced sense of isolation, and gaining information and empowerment (Malik & Coulson, 2008a). Downsides of the internet-based format also exist, including misunderstandings between members of the support group, feeling overwhelmed by the stories of others, and ineffectively managing involvement with the online group. Similar results regarding the negatives of online support were found by Malik & Coulson (2010). Online forums may provide a place for men to express negative emotions and difficulties associated with infertility more openly (Malik & Coulson, 2008b). Difficulties include their role in the infertility treatment process (primarily supportive), fear associated with experiencing hope, and feeling unimportant and lonely. Many men indicated it was helpful to express their feelings to others who understood. Themes that emerged within this online support group were frequent use of empathy, sharing personal experiences, providing information and advice, gratitude, friendship, casual conversation, and requests for advice. A study examining the effectiveness of a web-based cognitive behavioral intervention, found that infertility distress was not significantly reduced through this intervention (Sexton, Byrd, O'Donohue, & Jacobs, 2010). Overall, internet-based interventions are a way of reaching more people experiencing infertility, but are not without their downsides.

Individual Psychotherapy

Traditional individual therapy is one form of psychological intervention that may produce positive outcomes for individuals experiencing infertility, particularly if they have a co-occurring psychiatric disorder. In a study by Koszycki, Bissesse, Blier, Bradwejn, Markowitz (2012), participants experiencing infertility who met criteria for a major depressive disorder showed improvements on measures of depression and anxiety after a 12-week treatment of interpersonal psychotherapy or brief supportive therapy. Gains were better in the interpersonal psychotherapy treatment group compared to the brief supportive therapy, though both showed persistence in gains after a 6-month follow up. Interpersonal psychotherapy focuses on strengthening supports and coping with interpersonal stressors (Koszycki et al., 2012), which may prove beneficial given high levels of distress and reported social challenges for women dealing with infertility (Miles et al., 2009). Though individual therapy may be a psychological intervention pursued by men and women experiencing infertility, there is limited empirical research examining the effectiveness of specific treatment protocols on relieving stress and increasing coping skills in this population.

Additional Psychological Interventions

Research has explored the efficacy of other psychological interventions on infertility stress and distress. Chan, Ng, Chan, Ho, and Chan (2006) explored the impact of an eastern body-mind-spirit intervention on reducing anxiety in women undergoing their first IVF treatment. Following the intervention, there was a reduction in state anxiety compared to controls. Matthiesen et al. (2012) explored an alternative

intervention, expressive writing, for individuals receiving ART treatment. Their results showed that, individuals in the expressive writing group had decreased levels of infertility-related distress compared to controls assigned to the neutral writing group. At follow-up, which coincided with their pregnancy scan, distress levels increased among both groups. For those in the neutral writing group, stress exceeded baseline levels, whereas stress did not exceed baseline for the expressive writing group. These results are contrary to a previous study that found emotional disclosure did not help to reduce stress (Panagopoulou, Montgomery & Tarlatzis, 2009). Domar et al. (2011) conducted a study of a 10-session mind-body intervention that incorporated elements of CBT, relaxation training, negative health behavior modification, and social support components. The authors found that participants who had attended more than half the treatment sessions had a pregnancy rate of 52% while the rate for controls was only 20%. This study suggests that a stress reduction program may be efficacious in improving pregnancy rates for women undergoing IVF.

CHAPTER 3

TREATMENT IMPLICATIONS

Synthesis of Studies

Treatment for infertility is a growing area of the medical field and a common problem experienced by couples and individuals during their lifetime. From 2000 to 2009, the number of ART cycles increased by 50% and the number of live births roughly doubled (CDC, 2011). Approximately 10.6% of women ages 15-44 experience infertility, while rates for men vary between 7.2% from the ages of 25-29 to 14% by age 40 (Chandra et al., 2013). While age is primary predictor of fertility in men and women, other risk factors include smoking, excessive alcohol use, poor diet, engaging in unprotected sex, athletic training, being overweight or underweight, and environmental exposures (CDC, 2012b). Additionally, there are a number of primary infertility diagnoses that occur for men and women (RESOLVE, 2012b). A diagnosis of infertility typically occurs when a couple, who is unsuccessful in their attempt to become pregnant, seeks medical assistance (Greil et al., 2013). The experience of infertility appears to impact individuals and couples in their social and personal functioning (K. Bell, 2012; Ferland & Caron, 2013; Peronace et al., 2007), and is identified as one of the most stressful life experiences by women (K. Bell, 2013; Lykeridou et al., 2009). Stress is associated with reduced sperm quality in men (Gollenberg, 2010; Pook et al., 1999; Pook et al., 2004), and appears to have a modest negative impact on fertility treatment outcome for women (Matthiesen et al., 2011). Additionally, stress is associated with decreased ability to become pregnant for women attempting natural conception (Lynch et al., 2014). Extended periods of infertility is associated with more dissatisfaction and instability in

couples' relationships (Drosdzol & Shrzypulec, 2009; Gerrity, 2001), particularly for those who have been in treatment for longer periods (Sina et al., 2010).

Understanding the psychosocial experience of infertility is important, as mental stress appears to impact fertility (Lynch et al., 2014; Gollenberg et al., 2010; Pook et al., 2004), and may contribute to fertility treatment outcomes (Matthiesen et al., 2011; Ebbesen et al., 2009). Additionally, psychological burden is associated with treatment discontinuation (Olivius et al., 2004; Rajkhowa et al., 2006, Van den Broeck, 2009). Even when a limited number of IVF/ICSI cycles are offered at no charge or low cost, couples frequently discontinue treatment without engaging in the full program, with psychological distress cited as one of the primary reasons for drop out (Domar et al., 2010; Hammarberg et al., 2001). The stressful nature of infertility and its treatment requires that individuals and couples use coping strategies to moderate this stress. Coping approaches such as self-nurturance and positive reinterpretation (Benyamini et al., 2008), and self-compassion (Galhardo et al., 2013) are associated with lower infertility-related distress in women. In contrast, techniques such as confrontive coping, accepting responsibility for the infertility (Gerrity, 2001), information-seeking, and emotional avoidance are associated with worse adjustment and more distress (Benyamini et al., 2008). In men, seeking social support, planful problem solving, and distancing are associated with lower infertility-related distress (Stanton et al., 1992). Avoidance coping and failure to seek social support (Band et al., 1998), and self-control are associated with higher distress in men (Stanton et al., 1992). Some coping strategies that are beneficial at an individual level may lead to problems for partners (Peterson et al., 2006a).

While there are multiple aspects of the psychosocial experience of infertility that psychologists and mental health providers could address in treatment, utilization of mental health services remains fairly low (Holter, et al., 2007; Rajkhowa et al., 2006; Read et al., 2013). Couples appear more likely to reach for psychological services when they have experienced failed treatment (Sina et al., 2010). Patients may perceive mental health services as inaccessible (Boivin et al., 1999; Machin, 2011). It appears infertility counseling is a service often neglected by treatment providers, who may not be aware of the psychosocial difficulties that infertility causes (Machin, 2011). Individuals who utilize infertility counseling find it to be a helpful service (Machin, 2011; Read et al., 2013), and many patients identify it as a relevant service to be offered (Holter et al., 2007; Kerr et al., 1999; Rajkhowa et al., 2006). However, psychologists do not appear to be well-integrated into fertility clinic services (Gurmankin et al., 2005). In a study by Wischmann et al. (2009), more than half of men and women were open to counseling services, and nearly half attended counseling. This increased openness and access was due to the integration of psychological counseling into the fertility services from the outset of treatment, underlying the importance of integrating psychological services into fertility clinics early on. Emery et al. (2003) found acceptability of counseling services was 79% for patients offered a routine, pre-IVF treatment counseling session in which they share the history of their infertility. Over half of participants felt the service provided psychological support. This first-line intervention may be a helpful way of establishing contact with patients and could increase use of this supportive service later on for patients dealing with failed treatment.

Fertility counseling offered by psychologists and mental health professionals working within and/or consulting with a fertility clinic may help to improve the infertility experience for couples undergoing treatment. In particular, mental health treatment can assist patients in addressing infertility-related distress, managing stressors, enhancing coping techniques, addressing social concerns, improving communication between partners, and exploring the personal impact infertility has upon reaching life goals. Additionally, in the case of failed treatment course or the choice to discontinue treatment, fertility counseling could assist in facilitating goal readjustment and meaning-based coping. Integrating psychological services into fertility treatment early on is important to enhance patient openness and understanding of such services (Emery et al., 2003; Wischmann et al., 2009). Men who experienced fertility treatment reported clinic staff were an important source of support (Hammarberg et al., 2010). This suggests that there may be benefit to mental health professionals being integrated into the treatment team. Additionally, mental health professionals who are integrated within the treatment team may help improve communication between patients and providers, which is reported to be a crucial aspect of improving patient satisfaction with their care (Dancet et al., 2011). For psychologists and other mental health professionals wishing to assist individuals and couples experiencing infertility, there are three main points of entry in offering services: patients undergoing the diagnostic process, patients engaged in ART or other fertility treatments, and, for some, patients coping with failed treatment course and/or persistent infertility.

Psychosocial Treatment of Infertility

Psychosocial Interventions during Diagnostic Phase

Couples presenting for treatment at fertility clinics have often undergone a preliminary workup and/or treatment with their primary care provider prior to seeking advanced care (Wilkes et al., 2007). To receive services at a fertility clinic, the couples must undergo a thorough diagnostic workup and interview process that requires multiple visits to conduct testing and discuss results (Fritz, 2012). During this phase of treatment, mental health professionals may wish to conduct a counseling session to collect information about the patients' infertility history. Participants in a study by Emery et al. (2003) found a similar single session of therapy was helpful in gaining psychological support and discussing their relationship. In understanding the patients' infertility history, mental health professionals have an opportunity to normalize the common struggles faced during infertility and its treatment. Additionally, the use of assessment measures will help with early identification of those at risk for high distress and stress levels, which is known to contribute to treatment dropout (Olivius et al., 2004; Rajkhowa et al., 2006), and may reduce treatment success (Matthiesen et al., 2011; Turner et al., 2013). Clinical assessment will also assist in understanding cohesion between couples' infertility-related distress levels, which is importance because greater disparities are associated with poorer marital satisfaction (Benyamini et al., 2009;) and may reflect differences in coping (Peterson et al., 2006c). Additionally, understanding current stressors in the female partner's life is important as the number of negative life stressors a woman has recently experienced is negatively associated with treatment success even after controlling for

other factors such as length of infertility, age, distress (depression), and current level of perceived stress (Ebbesen et al., 2009).

A recommended measure for assessing infertility-related distress is the Fertility Problem Inventory (FPI), which is a 46-item questionnaire that assesses how infertility has impacted stress levels across five related domains: social concerns, sexual concerns, relationship concerns, need for parenthood, and rejection of a childfree lifestyle (Newton et al., 1999). These scores are totaled to achieve a global stress score. Another recommended measure for assessing psychological distress is the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1977). It may be important to measure acute anxiety (state anxiety), as it has been linked to higher levels of salivary alpha-amylase (Noto et al., 2005). Higher salivary alpha-amylase is associated with decreased ability to conceive naturally (Lynch et al., 2014). Additionally, a higher number of negative life stressors is associated with poorer treatment outcomes (Ebbesen et al., 2009), suggesting that assessment of recent life stressors would be important information to collect. The Holmes-Rahe stress scale is an excellent option for this assessment (Holmes & Rahe, 1967).

There is limited research examining the impact the infertility diagnostic workup has upon stress and distress levels when patients first enter treatment. It appears that most couples who seek fertility services are psychologically healthy, with similar stress and distress rates compared to the general population (Emery et al., 2003; Van den Broeck, D'Hooghe, Enzlin, & Demyttenaere, 2010), although other research suggests distress levels are higher for females than normative populations (Turner et al., 2013). For some patients, active coping to address the infertility may lead to reductions in stress levels

(Lewis et al., 2013; Pook et al., 2002). Research by Emery et al. (2003) and Wischmann et al. (2009) recommends early introduction of mental health services to couples, as it is associated with high patient openness and utilization of these services, particularly with short-term psychological interventions. Mental health professionals can provide an introduction to their role as part of the treatment team and an explanation of the psychological services offered. This is particularly important because knowing where to go and who to contact are barriers for patients in accessing psychological services (Boivin et al., 1999; Machin, 2011). The diagnostic phase is also recommended as a time to discuss the role stress plays in fertility and its treatment. Practical information about fertility treatment is an area identified by patients as important to their satisfaction with services (Dancet et al., 2011; Read et al., 2013). This discussion can be followed by an emphasis on stress management techniques. Additionally, since patients are about to enter treatment, they may be seeking technical information about the medical services offered (Emery et al., 2003). While providing technical information about infertility and its treatment is not the direct scope of practice for mental health professionals, they can work to facilitate communication between patients and providers and empower patients to advocate for themselves when questions arise throughout the treatment process.

As individuals and couples undergo the infertility diagnostic evaluation, mental health professionals have an excellent opportunity to introduce the services they offer as part of the fertility treatment program (Wischmann et al., 2009). As patients progress through treatment, it is beneficial for them to be aware of the support available should their distress become difficult to manage, as many individuals drop out of treatment early due to psychological burden (Domar et al., 2010; Olivius et al., 2004). Patients have

reported they are often unaware or uncomfortable in asking for psychological support (Machin, 2011), so presenting these services from the beginning will help to improve access and utilization (Wischmann et al., 2009). Early introduction of mental health professionals to patients undergoing infertility treatment can also help to identify those patients with higher distress levels who may benefit from more intensive psychological support.

In addition to introducing mental health services as part of the fertility treatment program and assessing couples for infertility-specific and general stress, mental health professionals may also take this time to connect patients with support and informational services online and in their community. The National Infertility Association has an established website www.resolve.org that provides up-to-date information on many aspects of infertility and its treatment, including an extensive list of in-person peer led support groups available throughout the United States, as well as an online support community. Patients undergoing fertility treatment identify peer support as an important psychosocial service (Read et al., 2013). The internet appears to be an important place where individuals and couples turn for information regarding their infertility problems (Weissman et al., 2000). Additionally, time is cited as a reason that couples do not utilize mental health services (Emery et al., 2003), so connecting patients with services they can access from the comfort of their homes may improve their access to support in managing their infertility experience. Online support may be another way to address mental health needs for men and women who do not seek help because of social stigma (Boivin et al., 1999; Slauson-Blevins et al., 2013).

Psychosocial Interventions during Fertility Treatment

As couples progress into and through the treatment process, mental health professionals can offer support to better manage stress and distress, enhance coping, and improve communication with partners, family, and friends. This may be provided through individual, couple, or group treatment. Qualitative studies of women experiencing infertility reported this life experience brought about challenges with sex, self-blame, hopelessness, treatment burnout, and disempowerment, as well as social difficulties including insensitivity and exclusion by others (K. Bell, 2013; Ferland and Caron, 2013). Men identified concerns regarding sex, and their relationship with their partner (Wischmann et al., 2009). Psychological distress during treatment appears to vary depending on whether this is a first time in treatment or whether the couple have experienced repeated ART cycles. One study found that 55% of psychological distress in infertility patients was predicted by more dependency, passive coping (avoidance), intrusiveness of the infertility experience, self-criticism, and less engagement with active coping (Van den Broeck et al., 2010). This reinforces the importance of focusing on coping skills in psychological treatment. Couples undergoing infertility treatment reported that they felt they would benefit from psychosocial support in coping with the emotional and physical stress of treatment (Read et al., 2013). Mental health providers working within and consulting with fertility clinics can offer such a service.

Given the potential impact of stress on pregnancy outcomes, patients may benefit from psychoeducation regarding stress and infertility (Ebbesen et al., 2009; Lynch et al., 2014; Matthiesen et al., 2013). Additionally, short term relaxation training may help to moderate stress and distress levels. In particular, guided imagery relaxation is associated

with decreased physiological indicators and self-report scores of anxiety in a sample of pregnant women (Urich et al., 2010). Progressive muscle relaxation has been shown to improve anxiety, depression, and improve quality of life after a 12-week intervention with endometriosis patients (Zhao et al., 2012). Stress-reduction around time of egg (oocyte) retrieval may be particularly important, as lower stress scores and higher infertility self-efficacy scores are associated with higher pregnancy rates in women undergoing IVF (Turner et al., 2013). One study of a mind-body intervention that incorporated elements of CBT, relaxation training, negative behavior modification, and social support components found that pregnancy rates were 52% for participants who had attended more than half of the 10-session program, and 20% for the control group who did not receive any skills training (Domar et al., 2011). As the authors pointed out, mind-body interventions are new within the treatment of infertility but appear to have a positive impact on treatment outcomes and may prevent worsening of distress over time (Domar et al., 2000). Use of body-mind-spirit techniques may help to reduce state anxiety (Chan et al., 2006).

In addition to relaxation training, integration of CBT techniques and behavioral interventions may improve infertility-related distress and enhance treatment outcomes. Cognitive coping strategies are directly associated with infertility-related distress levels. Kraaij et al. (2010) and Kraaij et al. (2008) found that self-blame, rumination, and catastrophizing was significantly associated with higher depressive symptoms in a sample of infertile women. CBT interventions may help to target the dysfunctional thoughts that arise regarding infertility (e.g. “I am an inadequate woman” or “I am less of a man.”), which will help to reduce emotional distress. CBT interventions may also help patients to

engage in coping strategies that are best fit for a low-control situation. Women first entering treatment may report lower distress levels than the normative population, possibly due to engagement in active-problem solving coping strategies (Lewis et al., 2013). However, research suggests coping strategies associated with low control situations, such as self-nurturing and positive reappraisal are associated with better psychological adjustment in women undergoing infertility treatment (Benyamini et al., 2008). CBT interventions are associated with greater reductions in anxiety than antidepressants for women undergoing treatment for infertility (Faramarzi et al., 2008). Additionally, CBT improved distress for infertile women with mild to moderate depression across five common areas impacted by infertility: social concerns, sexual concerns, relationship concerns, need for parenthood, and rejection of a childfree lifestyle (Faramarzi et al., 2013). Behavioral interventions may work to reduce or improve behaviors that are known risk factors for infertility. For example, smoking is significantly associated with reduced ability to become pregnant (Lynch et al., 2014). Additionally, weight loss of 5-10% in overweight women led to improved rates of spontaneous pregnancy (Khaskheli et al., 2013, Kort et al., 2014). Mental health providers may assist in managing the psychological barriers that exist in making such behavioral changes.

Couples therapy is another area where mental health professionals may offer assistance to better manage the infertility experience. Partners are an important source of support during the treatment process (Hammarberg et al., 2010). Couples who first begin treatment appear to have high marital satisfaction, which may reflect their joint decision to address the infertility (Gerrity, 2001). For some couples, the infertility process may also lead to marital benefit (Galhardo et al., 2013, Schmidt et al., 2005b). On the other

hand, couples who experience persistent infertility report a greater negative impact on their marriage (Drosdzol & Shrzypulec, 2009; Sina et al., 2010); therefore, it is important for mental health providers to collect information on how long the couples have been experiencing infertility and where they are in the treatment process. Couples undergoing fertility treatment report that couples therapy is beneficial in providing emotional support, enhancing communication, and understanding how the other partner copes with stress (Read et al., 2013). Research suggests that women and men use different coping strategies to manage infertility-related distress (Peterson et al., 2006b). Helping partners to understand how the other copes, as well as how coping styles may impact the other partner, could potentially reduce distress associated with discrepancies in coping styles. Additionally, differences in partners' assessment of the controllability of infertility is associated with higher distress (Benyamini et al., 2009). Discrepancies in level of involvement in trying to have a baby may also contribute to more distress (Pasch et al., 2002). Exploring these discrepancies and improving communication around these issues may help couples to better understand their partner. Another important area to address in therapeutic work with couples is their sexual life. Infertility is associated with higher sexual dysfunction for both men and women (Ferraresi et al., 2013). CBT therapies are shown to improve marital satisfaction, and more specifically, sexual satisfaction for couples experiencing infertility (Tuschen-Caffier et al., 1999). The mental health provider working with couples should take note to emphasize infertility as a couple's issue so as not to alienate either partner (Pasch et al., 2002). Men may be particularly prone to taking a secondary role supporting their wives, which may contribute to feelings of helplessness (Wischmann et al., 2009). Appreciating the roles partners take during

fertility treatment can help mental health professionals better appreciate the dynamics of the relationship.

Mental health providers may also wish to address social concerns that arise for patients experiencing infertility. For women, issues associated with social pressure to have children (Miles et al., 2009), insensitivity of others (Ferland & Caron, 2013), and feelings of exclusion by women with children (Loftus & Andriot, 2012) may be contribute to increased social stress. However, social support is also an important coping mechanism for women (Adams, 2002). Mental health providers may help in navigating conversations with friends and family regarding the infertility experience, encouraging couples to rely on each other as an important source of support, and even connect them with support groups locally or online. Research suggests infertile women experiencing strained social relationships may cope through avoidance of others (K. Bell, 2013; Loftus & Andriot, 2012). This can be detrimental, as avoidance coping is associated with higher distress (Band et al., 1998). Men also report social stress related to infertility (Peronace et al., 2007), and identify seeking social support as a common coping technique (Stanton et al., 1992). For men, seeking social support may not involve disclosure of the infertility experience (Slade et al., 2007). It is clear that social support is an important part of coping with infertility, which may come from a partner, family members, friends, or peers who have experienced infertility. Mental health professionals can help patients to tolerate uncomfortable emotions and thoughts that arise in social settings, as well as assertively navigate questions from others, to reduce avoidance, enhance self-efficacy, and potentially improve/expand social support for those experiencing infertility.

If individuals feel they are unable to get adequate support from friends and family, or they wish to connect with those who better understand the infertility experience, another option for mental health providers is to connect them to local support groups, online support groups, or to establish a support group at the fertility clinic. Peer support was considered very desirable by patients undergoing infertility treatment (Read et al., 2013). Additionally, peer support in person or online, may help patients to cope with the distress and isolation that can occur when friends and family do not understand the infertility experience (Hinton et al., 2010). Individual therapy may be a beneficial way to address social concerns and interpersonal difficulties, as research has shown individual therapy focusing on relational stressors and strengthening supports reduced depression and anxiety in infertile patients after 12 weeks of treatment (Koszycki et al., 2012). These gains persisted at the six-month follow-up. Such services may be recommended for individuals expressing higher levels of distress regarding their infertility experience.

Psychosocial Interventions after Failed Treatment

After failed treatment course, couples are faced with the decision to attempt another ART cycle, discontinue treatment temporarily, or to discontinue treatment permanently. Many couples discontinue treatment due to psychological burden, even when health insurance offers additional cycles at no or limited cost (Domar et al., 2010). Mental health providers may offer assistance to couples facing this decision, to help them make the decision that best fits their needs at the time. It is possible, through psychological treatment, that reductions in stress and distress and improvements in

coping may help couples to continue treatment so as to maximize the possibility of achieving pregnancy. However, Smeenk, Verhaak, and Braat (2004) emphasized the importance of respecting couples' decisions regarding treatment, as this can reflect a protective coping strategy to manage the pain of treatment failure and foster hope for returning in the future when distress is lower.

Repeated treatment failure and persistent infertility is associated with higher distress levels in patients. It is also associated with reduced marital stability and relationship satisfaction (Drosdzol & Shrzypulec, 2009; Gerrity, et al., 2001; Sina et al., 2010). During early treatment stages, couples appear to repress their negative emotions about the diagnosis and related events. While this avoidance may help to moderate distress in the beginning (Darwiche et al., 2013), for couples experiencing repeated treatment failures and/or who decide to discontinue treatment without attaining pregnancy, emotional processing may be an important part to coming to terms with the infertility experience. Women reflecting on their involuntary childlessness reported that being infertile was a lifelong pain (Ferland & Caron, 2013), and mental health professionals may provide assistance in coping with this pain and helping couples to find meaning in their lives through their next life path.

Understanding what factors contribute to increased distress and impact adjustment is important when treating couples with failed treatment course. Marital dissatisfaction, feelings of helplessness, and neuroticism (tendency to worry, be anxious) are associated with greater anxiety after treatment failure, while perceived social support and acceptance through reevaluation of the infertility stressor are protective (Verhaak et al., 2005a). This suggests that cognitions and social support are an important focus of psychological

treatment after an unsuccessful ART cycle. Kraaij et al. (2009) also emphasized the importance of cognitive coping strategies rather than behavioral strategies in managing emotions for couples who are definitively childless (cannot conceive a biological child). Finding positive meaning in the childlessness in terms of personal growth is associated with more positive affect, while self-blame and rumination are related to negative affect.

Goal readjustment may be an important focus for couples with persistent infertility. The importance of parenthood and intent to have children appear to have a strong connection to distress in women experiencing infertility (Jacob et al., 2007; Johnson & Fledderjohann, 2012). When this life goal cannot be met, couples may benefit from psychological assistance to help them with goal readjustment. Ferland and Caron (2013) demonstrated in their qualitative research that some patients may live out their value of parenthood through other options such as adoption, surrogacy, or fostering, while others may seek to work with children or invest more in their nieces and nephews. Additionally, K. Bell (2013) found that women living with involuntary childlessness were able to find positives in this experience, such as the ability to travel more freely and advance their careers. Positive reappraisal is not met to diminish the importance of parenthood, but rather to help patients identify new goals, or shift focus to other important goals that may bring about meaning and fulfillment in their lives. Childlessness is reported by some couples to bring them closer (Schmidt et al., 2005), which may be fostered through readjustment of life goals as a unit. Use of ACT may be a beneficial intervention to assist couples in coming to a place of acceptance of their life circumstances, and redirect their actions towards living out their values (Peterson & Eifert, 2011). Understanding how closely patients identify with being a parent may also

be an indicator of distress after treatment failure and discontinuation (Jacob et al., 2007; Johnson & Fledderjohann, 2012). ACT treatments are associated with decreased distress in women and decreased infertility-related sexual stress in men (Peterson & Eifert, 2011). The mindfulness and acceptance work within ACT may be an important tool to decreasing infertility-related distress and increasing cognitive flexibility to assist couples in living a fuller life, even if it does not include biological parenthood.

Providing transitional psychological assistance to couples discontinuing treatment is particularly important, as identifying those with psychological needs after they leave treatment is incredibly difficult. While mental health providers working with fertility clinics may not be able to offer the long-term treatment some individuals and couples need to better cope with the distress of treatment failure and involuntary childlessness, they can offer transitional care and make appropriate referrals to mental health providers within the couple's community. While the effects of infertility appear to be long-lasting, overall, couples appear to adjust fairly well to involuntary childlessness. Over-time, the desire to have children appears to diminish, the ability to see benefits in childlessness increases, and quality of life improves (Wischmann, Korge, Scherg, Strowitzki, & Verres, 2012).

Mental health providers working with fertility clinics have three main points of entry in offering services to couples undergoing fertility treatment: diagnosis phase, treatment phase, and dealing with treatment failure and discontinuation of reproductive services. Each of these phases presents unique opportunities for mental health providers to assist couples in managing their infertility experience. For those undergoing the diagnostic workup, mental health providers may want to establish early contact, which is

associated with increased openness and utilization of mental health services (Emery et al., 2003, Wischmann et al., 2009). Additionally, this may be an opportunity to conduct a clinical interview to learn about a couples' infertility history from a psychosocial perspective and to conduct a brief assessment of stress and distress levels. Once patients have entered active treatment, mental health providers may offer couple's therapy to enhance communication, emotional support, and understanding between partners (Read et al., 2013). They may also wish to address issues in sexual dysfunction and differences in coping. CBT is a model of treatment that has been shown to be effective in reducing infertility-related distress (Faramarzi et al., 2013). Mental health professionals can also help patients to cope with social concerns associated with infertility. If couples face the decision to try another ART cycle after a failed cycle or to discontinue treatment, mental health providers can assist in navigating this difficult choice. For those who choose to discontinue treatment, mental health professionals may use ACT techniques to help patients to adjust and accept these life circumstances and improve overall quality of life (Peterson & Eifert, 2011). Mental health professionals may also work to enhance coping in those dealing with persistent infertility. Overall, mental health professionals have multiple services to offer in helping couples to manage the infertility experience.

Future Directions

Infertility is a growing area of the medical field and a common problem experienced by couples and individuals during their lifetime. It is clear that infertility is a stressful life experience for women (K. Bell, 2013; Lykeridou et al., 2009), and one that impacts individuals and couples across biological, social, and psychological domains

(Ferland & Caron, 2013; Peronace et al., 2007). Additionally, stress is associated with decreased fertility in men and women (Lynch et al., 2014; Turner et al., 2013; Pook et al., 2004). Mental health providers may offer psychological interventions to couples during diagnosis, treatment, and in coping with failed treatment/discontinuation of treatment. The literature shows that couples express interest in psychosocial services to help manage the physical and emotional stress of the experience (Read et al., 2013), but may feel uncomfortable asking for this support from their providers (Machin et al., 2011) or may not know who to contact for such support (Boivin et al., 1990). Emery et al. (2003) and Wischmann et al. (2009) reported that early integration of psychological support into the fertility treatment program increased openness and utilization of treatment. Additionally, offering short term sessions (1-2) was cited as increasing patients' willingness to use mental health services. However, mental health providers do not appear well-integrated into the fertility treatment process (Machin et al., 2011) and are not part of routine screening process at fertility clinics (Gurmankin, et al., 2005). It appears that integration of mental health professionals into fertility clinics is an important step in connecting patients to mental health services during their treatment process. Additionally, integration of mental health services within primary care clinics is associated with increased provider and patient satisfaction (Funderburk, Fielder, DeMartini, & Flynn, 2012; Vickers et al., 2013). Similar results may translate into fertility clinics.

One unique service that mental health professionals may offer to couples undergoing fertility treatment is psychoeducation regarding stress and infertility, as well as interventions to better manage stress. There is a clear established relationship between stress and fertility for men, demonstrating reduced sperm quality in men with higher

stress levels (Gollenberg et al., 2010; Pook et al., 2004). Emerging research suggests that stress also reduced ability to conceive naturally in women (Lynch et al., 2014). A meta-analysis by Matthiesen et al. (2011) suggests that stress and trait anxiety are associated with poorer rates of clinical pregnancy in women undergoing ART treatment. Recent research by Turner et al. (2013) revealed that women with lower perceived stress and anxiety one day prior to egg (oocyte) retrieval were significantly more likely to become pregnant. Matthiesen et al. (2011) emphasized the importance of additional research to understand the underlying relationship between stress, distress, and treatment outcome. In particular, the current heterogeneity in the research makes it difficult to examine the relationship between stress, distress, and anxiety. Studies also use the terms distress and stress interchangeably, although these actually reflect different constructs. Additionally, many studies are cross-sectional, and those studies that do measure stress over the course of the ART cycle do so at varied times points (Turner et al., 2013). These studies also do not typically control for first versus subsequent ART cycles (Turner et al., 2013). Matthiesen et al. (2011) additionally discussed the importance of literature examining how distress and stress may impact the process from oocyte retrieval to live birth.

In addition to more research necessary to better understand the relationship between stress, distress, and fertility treatment outcome in women, additional research is necessary to understand the impact of psychological treatment on stress, distress, and treatment outcome. There is limited research examining the effects of specific treatment models, such as CBT, ACT, and interpersonal models on fertility treatment outcome. A literature review by Boivin et al. (2003) showed that psychological interventions associated with the best treatment outcomes lasted 6-12 weeks and emphasized education

and skills training rather than highlighting emotional expression, support, or discussions related to infertility. However, the authors also pointed out that there are limited studies that demonstrate methodological strength. Many studies do not randomize participants to group assignments and may use those who refuse treatment or drop out as the comparison group. Studies also tended to use questionnaires designed specifically for the study, without providing information of the psychometric properties of these measures. A study by Domar et al. (2011), who examined fertility treatment outcome in women undergoing a mind-body program that incorporated elements of CBT, relaxation training, negative behavior modification, and social support found that participants achieved pregnancy at significantly higher rates than controls, who did not receive skills training. The authors emphasized the need for more research examining the efficacy of stress management programs on fertility treatment outcome.

Additionally, research tends to blend women who are experiencing infertility together with women who are experiencing impaired fecundity. Impaired fecundity is the inability to carry a pregnancy to term and may not reflect a difficulty in becoming pregnant (Chandra et al., 2013). It is possible that women who experience impaired fecundity may differ psychologically from women who are unable to become pregnant. Additionally, despite increasing attention placed on understanding the infertility experience of men and women, there are many infertile sub-populations who remain relatively unstudied. There is limited research into the infertility experience of men and women using donor eggs, sperm, or surrogacy. Indeed, use of donor eggs or sperm is often part of the exclusion criteria from research on stress, distress, and infertility (Turner et al., 2013). Additionally, same-sex couples and singles are not fully represented in the

research, in part because fertility services are less available to these populations. Kissil & Davey (2012) reported that ART clinics may refuse services to unmarried individuals with or without partners. Gurmankin et al. (2003) found fertility clinics are more likely to refuse services to single men and gay couples seeking surrogacy, and less likely to turn away lesbian couples and single women. However, some states prevent non-married partners from accessing fertility services (Kissil & Davey, 2012). More research is necessary to understand the infertility experience among these populations, but this may be difficult to accomplish until services are more available. Additionally, minority groups are underrepresented among higher stages of fertility treatment (Greil et al., 2013), and less is known about how infertility and its treatment may present in these populations. Structural, financial, social, and environmental barriers stand in the way to accessing such services for many groups, limiting current understanding of the infertility experience in these populations and how mental health treatment might be tailored to fit their specific needs.

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Appendix A

A Guide for the Psychosocial Treatment of Infertility

How to Use this Guide: This guide is intended for use by practicing mental health professionals providing psychological services to couples undergoing treatment for infertility. It provides a brief overview of the infertility experience, including prevalence data, risk factors, medical treatment, psychosocial considerations, and recommended psychological assessment and intervention.

Definitions¹

- Infertility – An inability to become pregnant after one year of regular sexual relations without use of contraceptives.
- Impaired fecundity – The inability for a woman to carry a pregnancy to live birth.
- Assisted Reproductive Technology – Includes all fertility treatments in which both eggs and sperm are handled, as defined by the Fertility Clinic Success Rate and Certification Act of 1992.

Prevalence

- Approximately 6.7 million women of child-bearing age in the United States experience difficulties with conceiving and carrying a pregnancy to term.
 - 10.6% of the female population ages 15-44.²
- Infertility rates in men were reported at 7.2% for men ages 25-29 and 14% for men ages 40-44.²
- In 2002, approximately 1.2 million women had medical appointments related to fertility issues.³
- From 2000 to 2009, the number of ART cycles increased by approximately 50% and the number of live births roughly doubled.³

Risk Factors for Infertility⁴

- Smoking
- Excessive alcohol use
- Poor diet
- Engaging in unprotected sex
- Athletic training
- Being overweight and underweight
- Environmental risks, such as chemical and radiation exposure

Causes of Infertility

*Female Factor*⁵

- Endometriosis: A condition where the tissue that composes the uterine lining is found outside the uterine cavity.
- Ovulatory disorders: Any condition that impacts ovulation.

- Polycystic ovarian syndrome: Characterized by an imbalance in female sex hormones and known to increase risk for a number of chronic health conditions, such as cardiovascular disease and diabetes.
- Premature ovarian failure: When a woman's menstrual periods cease completely before age 40.
- Diminished ovarian reserve: A reduced ability by the ovary to produce an egg.³
- Uterine factor: Abnormalities in the uterus that impact a woman's ability to conceive and to carry a pregnancy to term. May occur due to congenital reasons or be acquired from surgery or infection.
- Tubal factor: Occurs when a woman's fallopian tubes are blocked or damaged, leading to difficulty in the travel of an embryo to the uterus.³
- Luteal phase defect: Occurs when the endometrium is insufficiently prepared for implantation of the embryo.

*Male Factor*⁵

- Low sperm count and/or poorly functioning sperm.
- Structural abnormalities.
- Ejaculatory disturbances:
 - Retrograde ejaculation: Sperm enters the bladder during ejaculation.
 - Impotence: Inability to develop or maintain an erection.
- Immunologic disorders: Includes endocrine disorders, which impact hormone levels and thus, fertility.

*Unknown Factor*⁵

- Unknown factor infertility is diagnosed when a biological cause cannot be found for infertility despite a thorough diagnostic workup.

*Multiple Factor*⁵

- Multiple factor infertility is diagnosed when the etiology of the infertility can be attributed to more than one underlying condition.

A Treatment Overview

*Diagnosis*⁶

- Diagnosis begins with a thorough medical history, including any previous pregnancies and associated complications, sexual history, duration of infertility, tobacco, alcohol, and drug use, assessment of symptoms (e.g. infrequent periods, pelvic tenderness), and screening for related medical conditions.
- A physical examination is conducted.
- Medical tests of ovulation and semen quality are then conducted if an infertility cause is not yet determined.
 - For women, this may include measuring basal body temperature, a transvaginal ultrasound, serum progesterone measurements, and using ovulation predictor kits.
 - Men may provide a semen sample for quality analysis.

- Men may also undergo an endocrine evaluation to assess hormone levels, or a urologic evaluation to assess for potential ejaculatory duct obstructions.
- If no infertility factor is yet found, women may undergo a hysterosalpingography or sonohysterography (ultrasound) to identify abnormalities in the uterine cavity or whether the fallopian tubes are unobstructed.
- Ovarian reserve tests are used to determine the size and quality of a woman's remaining oocytes (eggs). The current test of choice is measuring serum antimullerian hormone concentrations, as presence of this hormone drops over a woman's reproductive life and is non-detectable near menopause.

*Medications*⁵

- Aspirin – Prescribed for the prevention of miscarriage
- Heparin – Prescribed for the prevention of recurrent pregnancy loss due to elevated antiphospholipid antibodies
- Clomphene citrate (Brand names: Clomid & Serophene) – Prescribed short term (3-6 months) to induce ovulation, increase egg production, or correct irregular ovulation
- Follicle Stimulation Hormone – Used in ART procedures to stimulate follicle and egg production. Administered through injection.
- Human menopausal gonadotropin – Used in women who do not ovulated regularly, or in other ART procedures to stimulate follicle development. Administered through injection.
- Gonadotropin-releasing hormone agonists (Brand names: Lupron and Synarel) – Prescribed to treat endometriosis or used to prevent premature release of eggs during an ART cycle. Administered through injection or nasal spray.
- Bromocriptine mesylate and cabergoline (Brand names Parlodel and Dostinex) – Prescribed for men and women who produce too much of the hormone prolactin, which can interfere with normal production of other hormones associated with fertility.
- Progesterone – A hormone prescribed to improve the quality of the uterine lining. Comes in multiple forms of administration.

*Assisted Reproductive Technology (ART)*³

- One cycle of ART involves:
 - Type of procedure used
 - Use of patient eggs/sperm and/or donor eggs/sperm
 - Use of a newly fertilized or frozen embryo
- One ART cycle takes place over approximately 2 weeks
- ART Treatments
 - In Vitro Fertilization (IVF) – In this procedure a woman follows a strict drug regimen to help ripen her eggs, which are then removed from the female ovary and fertilized with semen. After a short period of incubation, the embryo is placed in the woman's uterus

- Intracytoplasmic sperm injection (ICSI) – Originally designed for male-factor infertility, this procedure involves injecting a single sperm directly into the woman’s egg.
- Gamete intrafallopian transfer (GIFT) – Similar to IVF, eggs are retrieved from the woman’s ovary. After egg retrieval, the egg and sperm are immediately transferred into the woman’s fallopian tubes with a laparoscope. No fertilization is documented prior to placement.
- Zygote intrafallopian transfer (ZIFT) – This procedure is similar to ZIFT, except fertilization is documented prior to placing the zygote into the fallopian tubes. No evidence of a dividing embryo is documented prior to placement.

Other Fertility Treatments³

- Ovulation stimulating drugs – Medication may be used to enhance a woman’s fertility or to regulate ovulation. Partners may attempt to conceive through sexual intercourse.
- Intrauterine insemination (IUI) – Sperm is placed in the woman’s uterus with the use of a catheter while she is ovulating. Ovulation-stimulating drugs are often taken in conjunction.

Psychosocial Experience of Infertility

Stress and Fertility

- Infertility is identified as one of the most stressful life experiences for women.^{7,8}
- Stress is associated with decreased ability to become pregnant in women who attempt to conceive naturally.⁹
- Psychological stress is associated with decreased sperm quality in men.^{10,11}
- Stress appears to be associated with ART treatment outcomes in women, though the contribution appears to be minimal.¹²
 - Additional research is necessary to better understand how stress may reduce ART treatment outcome.

Psychological and Social Aspects of Infertility

- Extended periods of infertility is associated with more dissatisfaction and instability within infertile couples’ relationships.^{13,14}
- Discontinuation of Treatment – psychological burden leads couples to discontinue infertility treatment, even when additional cycles may be covered by insurance providers.¹⁵
- Psychosocial issues that may arise with infertility in women include: difficulties with sex, self-blame, hopelessness, treatment burnout, disempowerment, social exclusion, and insensitivity from others.^{7,16}
- Psychosocial issues that may arise for men include: concerns about sex and their relationship with their partner, and taking a secondary role during treatment.^{17,18}

Treatment Guidelines

- For mental health professionals wishing to assist individuals and couples in managing their infertility experience, there are three main entry points into

offering psychological services: during the diagnostic process, while patients are undergoing fertility treatment, and in coping with treatment failure and/or persistent infertility.

Diagnosis

- Early introduction of psychological services is important to increase patient openness and utilization of psychosocial services.¹⁹
 - The diagnostic phase may be a time to introduce online and community support programs so that psychological support is represented as an integrated part of the fertility clinic services.²⁰
- Mental health professionals may wish to conduct a clinical interview to better understand the couple's psychological and social history of infertility.¹⁹
- Initial assessment will help to identify those with high stress and distress.
 - Assessment measures:
 - Fertility Problem Inventory²¹
 - State-Trait Anxiety Inventory²²
 - The Holmes-Rahe stress scale²³
- Mental health professionals can offer psychoeducation regarding the relationship between stress, distress, and infertility.⁹⁻¹²

ART Treatment

- Mental health professionals may wish to reinforce or introduce the relationship between stress, distress, and infertility.⁹⁻¹²
 - Relaxation training may help to improve stress management.^{24,25}
- Cognitive coping strategies may help to reduce infertility-related distress.
 - It may be particularly important to focus on issues of self-blame, rumination, and catastrophizing.²⁶⁻²⁷
 - Coping strategies of self-nurturance and positive-reappraisal are associated with better psychological adjustment in women.²⁸
- Behavioral interventions may help to improve treatment outcome by reducing risky behaviors such as smoking and alcohol use.⁹
- Couples therapy may address differences in partners regarding importance of parenthood, infertility-related distress levels, and coping strategies.²⁹⁻³¹
 - Many couples report marital benefit from the infertility experience.³²
- Mental health professionals may also want to assist individuals and couples in managing the exclusivity and insensitivity that can occur with others who do not understand the infertility experience.
 - Social support is an important coping strategy for men and women experiencing infertility. Seeking support groups or identifying existing relationships that are supportive would be important to reduce avoidance coping.³⁴

Failed treatment and discontinuation of services

- After failed treatment course, mental health professionals may help couples determine if they wish to attempt another ART cycle or discontinue services.

- Cognitive coping strategies appear particularly important in managing emotions in couples who are definitively childless.³⁵
 - Positive reappraisal and perceived social support are associated with better adjustment after failed treatment course.³⁶
- Discussing goal readjustment may help couples to explore alternative forms of parenthood, such as adoption, surrogacy, or participating more with extended family.¹⁶
- Acceptance and Commitment Therapy may help couples with finding acceptance, and finding alternative ways of living a value-based life.³⁷
 - This may involve exploring the importance a couple placed on biological parenthood.

Additional Resources

- National Fertility Association: www.resolve.org
- Center for Disease Control and Prevention:
 - www.cdc.gov/art
 - www.cdc.gov/reproductivehealth/Infertility/Index.htm
- American Society for Reproductive Medicine: www.asrm.org
- The American Fertility Association: www.theafa.org/

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