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The Relationship Between Infertility, Infertility Treatment, Psychological Interventions, and Posttraumatic Stress Disorder

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MA, Walden University, 2015

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The number of women diagnosed as infertile continues to grow every year. The psychological impact of the infertility experience has been said to create distress equivalent to that associated with life-threatening illnesses and has been linked with posttraumatic stress disorder (PTSD). Using shattered assumption and stress-buffering theory, this quantitative causal comparative study explored the potential functional relationship between infertility and PTSD. The majority of the (all-female) participants were 24- to 34-year-old college graduates. A 2 X 3 factorial between-subjects ANOVA examined and compared the cause and effect of the independent variables, fertility treatment and psychological intervention, on the dependent variable, PTSD. A multiple linear regression was conducted to understand PTSD symptomology scores. The results revealed that the type of infertility treatment does not impact PTSD symptomatology in medically diagnosed women. However, the main effect of psychological treatment was significant, as was infertility treatment by psychological treatment interaction. Additionally, the impact of fertility problems on the participant's physical health was the highest ranking predictor, which suggests that stress levels in women receiving infertility treatment are equivalent to those in women with cancer, AIDS, and heart disease, as suggested by other researchers. This study has implications for positive social change, in that it may promote better understanding of the psychological impact of infertility and decreased PTSD symptomatology for medically diagnosed infertile women. It opens the door for future research about the effectiveness of psychological intervention, and provides awareness of possible PTSD susceptibility.

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Dedication

I dedicate this body of work to my husband, Craig, and our three beautiful children, Victoria-Elizabeth, Liam-Alexander, and Gabriella-Alexis. Craig, you were Mom and Dad so many times. You picked up where I left off and took the children for countless hours to make sure I was able to catch up on needed sleep or write into the wee hours of the night that so quickly became morning. I love you immensely for so many reasons, but also for allowing my dream to become my reality.

Victoria, Liam, and Gabriella, with your patience and your understanding of why Mommy had to stay home while you went away for a day or a weekend, and of my absence of a week at a time, you made the impossible possible. In times that were difficult for all of us, you just smiled and said, “We love you, Mom,” “Have a good time with your school friends,” and “Study hard.” I know it was hard for you to understand at times, but know that your willingness to try and understand was never taken for granted. I love you all to the moon and back 3 billion times.

I also dedicate this to my mom and mother-in-law; you may not remember today, but I remember your words of praise. To the memory of my dad, you gave up everything, and I feel your smile. Last but not least, to my Heavenly Father, for without you, none of this would have been possible.

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Chapter 1: Introduction to the Study

Introduction

The inability to get pregnant after a full year of having regular, unprotected sex is defined as *infertility*, and according to researchers, it affects up to 15% of reproductive-aged couples worldwide and is recognized as a medical condition (Ali, Ebraheem, & Mohamed, 2013; World Health Organization, 2015). The Centers for Disease Control and Prevention (CDC, 2015) have reported that 6% of married women ages 15-44 years old in the United States are infertile and that about 12% of women 15-44 years of age, regardless of marital status, have had difficulty getting pregnant or carrying a pregnancy to term. Additionally, in 2013, 7.4 million women in the United States were reported to have used some form of infertility services (CDC, 2015). Infertility has been defined as not only a medical condition, but also as an experience that affects a person's social status; researchers have indicated that it causes considerable social, emotional, and psychological distress (Women's Health Council, 2009).

The research studies conducted on infertility treatment and psychological effects have been both qualitative and quantitative. Klock and Lee, Sun, and Chao (2001) suggested that an infertility diagnosis derails an individual from meeting an important life goal. Klock further suggested that this interference is devastating to the infertile individual. In a national survey of 585 infertile women and men, 71% of the female participants and 50% of the male participants indicated feelings of inadequacy, and 53% reported relational problems due to their inability to share their sense of guilt, depression, isolation, anxiousness, psychosomatic complaints, and irritable and avoidant behavior with their partner (Klock, 2011; Women's Health Council, 2009). Rosner (2012)

conducted in-depth interviews with 12 infertile women, aged 35-54, who underwent unsuccessful infertility treatment. Rosner concluded that the initial infertility identity as well as the impact of being infertile and living without children after pursuing treatment had a profound adverse effect on marriage, relationship, and identity for the studied population.

In-Vitro Fertilization

According to Lundborg, Plug, and Rasmussen (2014) and Okwelogu, Azuike, Ikechebelu, and Nnebue (2012) in-vitro fertilization (IVF) treatment is the leading medical intervention utilized to manage infertility. The IVF procedure entails the use of fertility medications to stimulate egg production, removal of the egg(s) from the infertile woman's ovary, and combining the egg(s) with sperm in a laboratory culture dish (Lundborg et al., 2014; Okwelogu et al., 2012). If an egg fertilizes, it is transferred back into the infertile woman's uterus; a successful transfer is determined if the egg attaches to the uterine lining (American Society for Reproductive Medicine [ASRM], 2015).

Although the IVF fertility procedure takes place outside of the woman's body, the IVF fertility protocol takes approximately 2-4 weeks and is dependent on the individual's drug regiment (Carter et al., 2011; Okwelogu et al., 2012; Verhaak et al., 2007). IVF has proven to be the most effective form of fertility treatment, yet it has also been reported to cause the greatest amount of emotional distress. Additionally, IVF is said to be a social and financial burden (Carter et al., 2011; Lundborg et al., 2014; Okwelogu et al., 2012; Verhaak et al., 2007).

Lukse and Vacc (1999) researched the emotional impact of infertility treatment for women undergoing IVF and ovulation induction. Two groups were compiled: One

group consisted of 50 women undergoing IVF treatment, and the other group consisted of 50 women receiving ovulation-induction medication. Both groups studied by Lukse and Vacc showed increased signs of distress and depression before, during, and after treatment. Lukse and Vacc suggested that the increased signs of distress and depression were not the consequence of previous failed IVF cycles or other external economic and/or social factors.

Verhaak et al. (2007) conducted a study of 298 infertile women undergoing IVF and intracytoplasmatic sperm injection (ICSI) treatment for the first time. The purpose behind the study was to find out if there were long-term psychological effects in women who had undergone IVF and ICSI fertility treatment (Verhaak et al., 2007). All of the participants within the study group showed elevated anxiety and depression during treatment (Verhaak et al., 2007). The researchers also reported that the group of women who had not achieved pregnancy had not developed an ability to adapt to their inability to get pregnant and continued to show signs of heightened anxiety, in comparison to the group of women who had achieved a successful live birth (Verhaak et al., 2007).

Based on a study of 291 infertility patients undergoing IVF and ICSI treatment, Smeenk et al. (2001) linked increased levels of anxiety to the inability to become pregnant. Smeenk et al. reported that the elevated state anxiety levels were above the tested measures of depression and suggested that the findings were more apparent during the implanting stage. The authors also stated that these conclusions were prominent and could challenge the previous explanation of age being the determining factor in an individual's inability to become pregnant (Smeenk et al., 2001). Furthermore, researchers have indicated that the stress reported by infertile women undergoing IVF treatment is

comparable to the stress experienced by those diagnosed with life-threatening diseases that have also been linked to posttraumatic stress disorder (PTSD; Grell, McQuillan, Lowry, & Shreffler, 2011).

Posttraumatic Stress Disorder

According to the American Psychological Association (APA, 2013), PTSD is diagnosed in patients with persistent psychiatric distress resulting from events involving actual or threatened death or injury. The *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) states that PTSD includes, but is not limited to, repeated or extreme exposure to aversive details of the event or events, intense or prolonged distress, marked physiological reactivity after exposure, and intrusive memories (APA, 2013).

The definition of PTSD was designed to describe the suffering of veterans returning from war; even so, researchers are suggesting, because of the PTSD-like symptoms reported by infertile women, that the suffering population should now include women who experience reproductive problems, including infertility treatment (Schwerdtfeger & Schreffler, 2009). Schwerdtfeger and Shreffler (2009) argued that the inclusion is warranted due to reports of significant PTSD symptoms among infertile women. Nevertheless, to date, there have been limited to no published research studies that have examined the relationship between infertility and PTSD. Researchers have linked the cause of PTSD to a person's medical illness and have stated that the severity of a person's disease does not predict the level of the person's risk for PTSD (Posluszny, Edwards, Dew, & Baum, 2011; "Posttraumatic Stress Disorder," 2015).

Psychological Intervention for PTSD

Litz et al. (2015) and Shubina (2015) stated that early psychological intervention effectively reduces the symptoms of chronic PTSD, depression, and anxiety symptoms. Cognitive-behavioral therapy (CBT) and eye movement desensitization and reprocessing (EDMR) have been reported to be the most effective form of evidence-based psychological intervention to reduce PTSD symptoms (Roberts, Kitchiner, Kenardy, & Bisson, 2010). Roberts et al. (2010) also reported that an increasing number of attempts are being made "to develop interventions that might mitigate against the effects of trauma and prevent the onset of chronic PTSD" (p. 3). Furthermore, Domar and Prince (2011) stated that many studies showed that psychosocial interventions reduced distress in a woman undergoing infertility treatment.

Background

When a woman is diagnosed as infertile, there is a potential increase of stress for her, due to perceived social, emotional, and psychological distress (Hasanpoor-Azghdy, Simbar, & Vadadhir, 2014; Woman's Health Council, 2009). Domar et al. (2012) indicated that this perceived distress is compounded by advanced infertility treatment, which, according to Zuraida (2010), is sought out by 75% of individuals who have been diagnosed as infertile. Although both the number of medically diagnosed infertile women and the number of invasive infertility treatments in the United States have significantly increased, the long-term emotional effects of the diagnosis and treatment are not entirely understood (Ahuja, 2009; CDC, 2015; Schwerdtfeger & Shreffier, 2009). In 2010, Zuraida stated, "Over 100 quantitative studies and 26 qualitative studies had been published on the topic of the relationship between infertility and psychological distress"

(p. 2). Additionally, Domar, Zuttermeister, and Friedman (1993) and Frederiksen, Farver-Vestergaard, Skovgard, Ingerslev, and Zachariae (2015) stated that the stress levels in women receiving infertility treatments were equivalent to those of women with cancer, AIDS, and heart disease, all conditions that have been linked to PTSD. However, I found no studies linking PTSD to infertility.

Based on published studies and using a theoretical framework consisting of cognitive appraisal and stress buffering theory, it is hypothesized that the medically diagnosed infertile woman's worldview and support system are not interrupted before an infertility diagnosis and/or fertility treatment. Thus becoming a problem because the woman is unable to see herself as a competent individual and experiences an extended period of isolation. The individual is prevented from developing coping strategies to deal with the increased stress, and the psychological impact may lead to undiagnosed PTSD.

Although researchers have indicated that the diagnosis of infertility changes the individual's self-image and causes extreme stress, I have found limited to no research studies that examined the prolonged effect of the diagnosis on the infertile individual (Klock, 2011; Women's Health Council, 2009). Although Ahuja (2009) and Huppelschoten et al. (2012) stated that psychological intervention throughout the infertile individual's fertility protocol would not only assist the infertile individual in coping with the psychological burden of infertility, but also would prevent the risk of clinical depression, anxiety, and the long-term psychological effects and symptoms that have been reported to be caused by infertility treatment, published studies of the long-term psychological effects of advanced infertility treatment on the infertile individual are limited. Lastly, although researchers have suggested that the psychological impact of

infertility treatment meets the diagnostic criteria for PTSD, no research studies have been conducted that have linked the two. Thus, an examination of the relationship between infertility diagnosis, fertility treatment, therapeutic intervention, and PTSD is warranted.

Problem Statement

Researchers have defined the trauma of infertility as invisible, suggesting that as soon as the individual is informed of his or her new condition, the diagnosis triggers a traumatic event (Jaffe & Diamond, 2011). Additionally, Domar et al. (1993) suggested that the diagnosis of infertility meets the chronic stress criterion of duration of more than 12 months. The underlying anxiety is based on the infertile person's acute awareness and is in alignment with the physical, cognitive, and emotional reaction to anything that reminds the person of the original trauma and possibly the constant fear of never having a child (Jaffe & Diamond, 2011). Although the existence of trauma, the duration of chronic stress, and the constant presence of fear meet the diagnostic criteria for PTSD, I have located limited studies linking PTSD to infertility. Researchers, however, have found that the stress level in women receiving infertility treatments is equivalent to that in women with cancer, AIDS, and heart disease (Domar et al., 1993; Frederiksen et al., 2015).

Schwerdtfeger and Shreffier (2009) suggested that because there has been a lack of studies on the impact of infertility and its treatment, more studies that address the psychological consequences of infertility, as well as the long-term effects of treatments on infertility, are needed. Schwerdtfeger and Shreffier also stated that further research is required to define the significant and enduring psychological and relational consequences of reproductive problems, and Grell (1997) concluded that both quantitative and qualitative research has a contribution to make in the understanding of the experience of

infertility. Schwerdtfeger and Shreffier further suggested that more research needs to focus on the psychological effects on the duration of infertility, the experience of treatment, and how the two affect one another. Therefore, this study focused on the psychological impact and the possible relationship among an infertility diagnosis, fertility treatment, therapeutic interventions, and PTSD in medically diagnosed infertile woman.

Purpose of the Study

The purpose of this quantitative nonexperimental static-group comparison and correlational research study was to determine the potential functional relationship between advanced infertility treatment (yes, no), psychological intervention (yes, no), and PTSD in medically diagnosed infertile women. In addition, PTSD symptomology scores were examined as accounted for in a multiple linear regression by the four Fertility Quality of Life (FertiQol) subscale scores and the five Fertility Problem Inventory (FPI) subscale scores.

Research Questions and Hypotheses

1. What is the extent of difference in PTSD symptoms between medically diagnosed infertile women who (a) do and do not undergo advanced infertility treatment, (b) do and do not undergo psychological intervention, and (c) the interaction of advanced infertility treatment and psychological intervention?

The following hypotheses assume controlling for the other factor and interaction effect.

$H_0$1: There is no significant difference in PTSD symptoms between medically diagnosed infertile women who undergo advanced infertility treatment and

medically diagnosed infertile women who do not undergo advanced infertility treatment.

$H_1$1: There is a significant difference in PTSD symptoms between medically diagnosed infertile women who undergo advanced infertility treatment and women who do not undergo advanced infertility treatment.

$H_0$2: There is no significant difference in PTSD symptoms between medically diagnosed infertile women who receive psychological intervention and medically diagnosed women who do not receive psychological intervention.

$H_1$2: There is a significant difference in PTSD symptoms between medically diagnosed infertile women who receive psychological intervention and medically diagnosed women who do not receive psychological intervention.

$H_0$3: There is no advanced infertility treatment and psychological intervention interaction effect on PTSD symptoms.

$H_1$3: There is an advanced infertility treatment and psychological intervention interaction effect on PTSD symptoms.

2. What is the overall and relative effect of the four FertiQol subscale scores and five FPI subscale scores in accounting for variance in PTSD symptomology scores?

This examination followed a model-building approach (Jaccard & Jacoby, 2010), rather than the specification and testing of specific hypotheses, for the purpose of describing the most effective model of variables that explain PTSD symptomology (Cohen, Cohen, West, & Aiken, 2003; Jaccard & Jacoby, 2010; Tabachnick & Fidell, 2007) and comparing the relative contribution of each variable in the model (Cohen et al.,

2003; Jaccard & Jacoby, 2010; Tabachnick & Fidell, 2007) in order to rank order potential targets of interventions to reduce PTSD symptomology.

Theoretical Framework

Shattered Assumptions

Janoff-Bulman's (1992) cognitive appraisal theory referred to as *shattered assumptions* addresses beliefs about the self, the future, the world, and trauma's insult to meaning systems. The approach provides details on individuals' assumptions in relation to their worldview and how this worldview provides individuals with meaning, self-esteem, and the illusion of invulnerability. Shattered assumptions theory indicates that when people experience events that violate their worldview, they may no longer perceive the world as benevolent and predictable (Janoff-Bulman, 1992). Individuals may then begin to question their competency, sense themselves as invulnerable, and thus experience PTSD symptoms (Janoff-Bulman, 1992).

Janoff-Bulman (1992) stated that there are three core assumptions held by most people about the world and themselves. These assumptions may be shattered by traumatic events, for these assumptions coexist with emotions. Labeling the three fundamental assumptions as *the world is benevolent*, *the world is meaningful*, and *the world is worthy*, Janoff-Bulman argued that the "fundamental assumptions are the bedrock of our conceptual system" (p. 5). Additionally, the author stated that these core assumptions are less likely to be challenged because people are not aware that they exist (Janoff-Bulman, 1992).

The first assumption, *the world is benevolent*, defines how the individual feels about people and events of the world (Janoff-Bulman, 1992). Shattered assumptions

theory indicates that most people believe that other people are "basically good, kind, helpful, and caring" (p. 6) and that positive events highly outweigh the misfortunes of the world. *The world is meaningful* suggests that there is a reason why things happen to people: Good things happen to good people, and bad things happen to bad people (Janoff-Bulman, 1992). Lastly, Janoff-Bulman (1992) asserted that most people perceive themselves as good, capable, and moral individuals, therefore maintaining that *the world is worthy*. This assumption involves a person's self-worth, self-judgment, and self-evaluation, and it suggests that the individual believes that he or she is competent and can control both positive and negative outcomes of life (Janoff-Bulman, 1992).

Janoff-Bulman's (1992) shattered assumptions theory is helpful when examining the relationship between infertility and PTSD, in that infertility often comes as a surprise, as one's ability to conceive is sometimes taken for granted. Not only is the newly diagnosed infertile woman's worldview violated, but also the woman may experience feelings of incompetence, defectiveness, and vulnerability (Galhardo, Gouvela-Ointo, Cunha, & Matos, 2011; Janoff-Bulman, 1992). Additionally, parenthood represents a significant transition in adult life, and the stress of the nonfulfillment of the wish for a child has been found to produce anger, depression, anxiety, marital problems, and feelings of worthlessness in infertile individuals (Deka & Sarma, 2010).

Janoff-Bulman's (1992) shattered assumptions theory suggests women who are diagnosed as infertile either no longer perceive the world as benevolent and predictable or see themselves as competent and invulnerable and are prone to experience PTSD symptoms (Edmondson, Chaudoir, Mills, Holub, & Bartkowiak, 2011; Park, Mills, & Edmondson, 2012). This approach involves the assumption that that the infertile

woman's experience is new and due to her diagnosis and/or fertility treatment. Therefore, it is hypothesized that diagnosed infertile women have not experienced PTSD symptoms prior to their infertility diagnosis and/or infertility treatment.

Social Support & Stress-Buffering Theory

Cobb's (1976) social support and stress buffering theory explains how supportive social relationships assist individuals in coping with stressful events and prevent people from experiencing deleterious outcomes. According to Cobb (as cited in Cohen & Pressman, 2004),"those who interpreted communication from others signifying that they were cared for, and valued, and that they belonged to a network of mutual obligation were protected" from risk (p. 780).

According to Cobb (1976), social support begins in utero, and as life progresses, support is needed and received increasingly from others, including, but not limited to, helping professionals. Cobb asserted that a person's support system changes during his or her lifetime and suggested that an individual's need for support increases when unexpected life crises take place. Cobb also theorized that social support protects the individual against health problems that are associated with stress, which assists the individual in coping and developing the ability to master his or her problems. Furthermore, Cobb stated that social support would "reduce the amount of medications required and accelerate recovery and facilitate compliance with prescribed medical regimens" (p. 310). Numerous studies have supported the theory, and Cohen and Wills (1985) stated that people with spouses, friends, and family members who provide psychological and material resources are in better health than those with fewer supportive social contacts. Additionally, "several prospective epidemiological studies have shown

that social support is related to mortality" (Cohen & Wills, 1985, p. 310). Bomyea, Risbrough, and Lang (2012); High and Steuber (2014); and Nugent, Amstadler, and Koenen (2011) also suggested that lack of social support is one of the strongest risk factors for PTSD.

Previous studies have reported that infertility causes grief, shame, and isolation and have stated that these experiences are due to the infertile individual's inability to discuss the condition with friends and family due to a sense of failure (Howarth, 2011; Jessup, 2005). Studies have indicated that infertile individuals experience an unexpected loss of community as they continue to struggle to become parents while their peers succeed in following the typically expected path of adulthood (Jessup, 2005). Jahromi and Ramezanll (2014) stated that inability to cope with this stressful, unforeseen situation hampers women's ability to think reasonably and maintain problem-solving coping strategies, even as the need for emotional coping skills increases due to perceived "lack of control, low self-esteem, low social support, and higher level of stressors" (p. 1). Frederiksen et al. (2015) suggested that psychological intervention can improve the infertile woman's coping skills and emotional well-being during infertility treatment, and Jahromi and Ramezanll (2014) indicated that understanding which forms of coping strategies are used most frequently by infertile women is important.

According to Cobb's social support and stress buffering theory, with a lack of supportive social relationships, a medically diagnosed infertile woman may be unable to cope with the stressful event of diagnosis and treatment, thus increasing her chance of a deleterious outcome and potentially leading to PTSD (Cohen & Pressman, 2004; Nugent et al., 2011).

Nature of the Study

For this quantitative nonexperimental static-group comparison and correlational research study, I used a factorial ANOVA to examine the functional relationship between fertility treatment, psychological intervention, and PTSD, allowing a numeric description of effect while also using multiple linear regression to help explain PTSD symptomology scores by the four subscale scores of the FertiQol and the five subscale scores of the FPI. The participants included women 24-44 years of age who had received a medical infertility diagnosis, may or may not have gone through fertility treatment (successful or unsuccessful), and may or may not have received psychological intervention throughout their infertility protocol.

All participants were surveyed using the PTSD Checklist for DSM-5 (PCL-5), the Infertility Questionnaire (FertiQ), and the Fertility Problem Inventory (FPI), with data collected on a secured designated website. The goal of using the factorial ANOVA and the multiple linear regression was to examine the effect of the independent variables fertility treatment and psychological intervention on the dependent variable, PTSD, concurrently while determining and explaining differences in PTSD scores (McDonald, 2014). Once all questionnaires were completed, the computer identified the sample groups based on whether or not they received infertility treatment with or without psychological intervention. The data were then imported into SPSS for statistical analysis, which is discussed further in Chapter 4.

A factorial ANOVA was appropriate for the research study because it made it possible to determine and explain the differences in the PTSD score while examining the effect of the independent variables, fertility treatment and psychological intervention, on

the dependent variable, PTSD (McDonald, 2014; Mertler & Vannatta, 2013). Additionally, multiple linear regression was appropriate for the research study because it predicted to what extent the individual participants' quality of life contributed to reported PTSD symptomatology (McDonald, 2014; Mertler & Vannatta, 2013). On the other hand, a descriptive research study was not chosen for this study, because I was not seeking to develop a theory or hypothesis.

Definitions

The following terms are defined as they are used throughout this study.

Abortion: An external intervention used to eliminate a human fetus before it has the ability to survive outside the womb (Grisanti, 2000).

Assisted reproductive technology (ART): All fertility treatment that includes the handling of human oocytes and sperm or embryos. The surgical removal of eggs from a woman's ovaries and the integration of the eggs with sperm in a laboratory with the intent to replace the egg in a woman's body (CDC, 2015).

Beta human chorionic gonadotropin (bHCG): The term that describes pregnancy hormones that are used to diagnose pregnancy (Singh, Begum, Malhotra, Bahadur, & Vanamail, 2013).

Blastocyst: Describes a 5-day-old embryo in which many cells surround the cystic cavity (Hardarson, Van Landuyt, & Jones 2012).

Clomid (Clomiphene): An oral medication that causes the pituitary gland to release hormones and stimulate ovulation (Burns & Covington, 1999).

Cognitive behavioral therapy (CBT): A type of psychotherapy that focuses on exploring relationships among a person's thoughts, feelings, and behaviors (National Alliance on Mental Illness, 2016).

Eye movement desensitization and reprocessing (EMDR): An integrative treatment for PTSD in which a patient recalls a disturbing image in his or her mind while tracking an object, recalling the negative thoughts and body sensations associated with a traumatic memory (Chemtob, Tolin, van der Kolk, & Pitman, 2000).

Follicle-stimulating hormone (FSH): The pituitary hormone responsible for the stimulation of estrogen production from the follicle cells around the egg ("Follicle-Stimulating Hormone," 2014).

Gamete intrafallopian transfer (GIFT): A procedure like IVF, but in which the healthiest eggs and sperm are placed together in the woman's fallopian tubes in the hope of fertilization (Burns & Covington, 1999).

Gonadotropin-releasing hormone (Gn-RH): Synthetic hormones secreted by the hypothalamus to increase or decrease FSH and LH production in the pituitary gland (Burns & Covington, 1999, p. 592).

Human chorionic gonadotropin (hCG): A hormone that increases early in pregnancy; it is produced by the placental tissue (Burns & Covington, 1999).

Human menopausal gonadotropin (hMG): Preparation of FSH and LH derived from menopausal urine (Wisot & Meldrum, 2004).

Hyperstimulation: A constellation of signs and symptoms that indicate excessive stimulation of the ovaries, with effects ranging from mild discomfort to severe complications (Burns & Covington, 1999).

Hysterosalpingogram (HSG): Diagnostic test of the uterus and fallopian tubes (Simpson, Beltia, & Mester, 2006).

Hysterosonogram (HYS): Diagnostic test of the female uterus (Ahmad, Sadek, & Ragheb, 2015).

Infertility: The inability to get pregnant after 1 full year of having regular unprotected sex (Ali et al., 2013; World Health Organization, 2015).

Intracytoplasmatic sperm injection (ICSI): A laboratory procedure wherein a single sperm is injected into an egg cell for the purpose of achieving fertilization and pregnancy (Wisot & Meldrum, 2004).

Intrauterine insemination (IUI): A clinical procedure in which the sperm is inserted through the natural opening of the uterus and deposited directly into the uterus using a catheter for the purpose of attaining pregnancy (Wisot & Meldrum, 2004).

In-vitro fertilization (IVF): A laboratory procedure in which fertilization is attempted by placing many sperm cells in unfertilized eggs (Burns & Covington, 1999).

Laparoscopy or laparoscopic surgery: A procedure in which a tube is placed through a small incision in the woman's belly to see inside the abdominal walls of the female pelvic organs (Nakamura et al., 2016).

Luteinizing hormone (LH): The pituitary hormone that triggers ovulation and stimulates the corpus luteum of the ovary to secrete progesterone and other hormones during the second half of the menstrual cycle (Burns & Covington, 1999).

Miscarriage: The naturally occurring expulsion of a nonviable fetus and placenta from the uterus (Burns & Covington, 1999).

Oocyte: An immature female reproductive cell, the egg (Wisot & Meldrum, 2004).

Ovarian hyperstimulation syndrome (OHS): A condition that may result from ovulation induction, characterized by enlargement of the ovaries, fluid retention, and weight gain (Burns & Covington, 1999).

Polycystic ovarian syndrome (PCOS): An endocrine-metabolic disorder characterized by multiple hormonal imbalances, reflecting a clinical presentation dominated by manifestations of hyperandrogenism, which generate short- and long-term consequences for female health (Rojas et al., 2014).

Posttraumatic stress disorder (PTSD): Persistent psychiatric distress resulting from events involving actual or threatened death or injury (APA, 2013).

Primary ovarian insufficiency (POI): Premature menopause (Cox & Liu, 2014).

Prolonged exposure therapy (PE): A specific exposure therapy program with three main components: in vivo exposure to trauma reminders, imaginal exposure to the memory of the traumatic event, and processing of imaginal exposure (McLean & Foa, 2011).

Zygote intrafallopian transfer (ZIFT): A procedure like GIFT in which the healthiest eggs and sperm are placed together in the woman's fallopian tubes in the hope of fertilization. However, there is a 24-hour waiting period before transfer occurs (Burns & Covington, 1999).

Assumptions

Based on the eligibility questions, I assumed that all of the participants had been medically diagnosed as infertile and had completed their fertility treatment at least 12

months prior to their participation in the study. I also assumed that all of the participants answered the questions truthfully because they chose to voluntarily take part in the study. Lastly, I assumed that all of the participants were able to read English independently. These assumptions were necessary because the participants' anonymous information and voluntary participation were important to the well-being of research participants (Kaiser, 2009).

Screening and Cleaning of Data for Statistical Assumptions

Variables were screened for univariate and multivariate outliers, and cases were eliminated from the analysis as needed. Following Tabachnick and Fidell (2007a), univariate outliers are cases with standardized scores greater than 3.29 ($p < .001$) and that are discontinuous with the distribution. Also following Tabachnick and Fidell (2007a), multivariate outliers are cases with Mahalanobis distances that are greater than the associated $\chi 2$ value for $p < .001$ and discontinuous with the distribution.

ANOVA assumed that the sampling distribution was normally distributed, which the central limit theorem reassures us of error degrees of freedom (*df*) greater than about 20 (Tabachnick & Fidell, 2007b). With a target sample size of 200, error *df* for the 2x3 full factorial ANOVA would be 196. ANOVA also assumes independence of error, but such is not applicable to nonexperimental independent variables (Tabachnick & Fidell, 2007b). Finally, ANOVA assumes homogeneity of variance, which is examined by Levene's test of equality of error variances. However, even if significant, ANOVA is robust to violation of this assumption (Tabachnick & Fidell, 2007b).When a severe violation is encountered—largest variance of a cell is more than 10 times the smallest

variance of a cell—consideration is given to the use of a more stringent alpha level (Tabachnick & Fidell, 2007b).

Multiple regression assumes normality, linearity, and homoscedasticity of residuals. Following Tabachnick and Fidell (2007a), such was visually examined in residual scatterplots. For transparency, apparent violations were reported, but nonnormality does not affect significance tests or confidence intervals (Cohen et al., 2003), nonlinearity does not invalidate the analysis (Tabachnick & Fidell, 2007a), and heteroscedasticity does not affect regression coefficients and only marginally affects significance tests and confidence intervals in the extreme case of the largest to smallest residual spread being more than three standard deviations (Cohen et al., 2003; Tabachnick & Fidell, 2007a).

Scope of Delimitations

The results from this study are only applicable to medically identified infertile women living in the United States. Secondly, although some women are identified as infertile beyond medical reasons, such as genetics and age, this study only solicited feedback from medically diagnosed infertile women between the ages of 24 and 44. Although the State Data Center (2015) reported reproductive age to be 13-44, I chose to exclude the 13- to 23-year-old population for reasons including, but not limited to, minor vulnerability, average reported age of women seeking infertility treatment, and age-appropriate fertility treatment protocol (APA, 2015; Frankfort-Nachmias & Nachmias, 2008). Furthermore, based on population vulnerability, this study excluded individuals who were presently seeking fertility treatment and who had undergone treatment within the last 12 months, with the intent to minimize harm (APA, 2015). Additionally, the

average age of pregnant women whose pregnancies resulted in live births was not considered due to the inability to distinguish the number of live births that were due to a third-party donor affiliation (e.g., ovum donor, sperm donor, surrogacy, etc.).

Likewise, the study did not include feedback from the 20% of men who are also diagnosed as infertile (CDC, 2015). Infertile women were chosen to participate in the study because of the literature review, which indicated that although men and women are both affected by infertility, a higher percentage of women are diagnosed as infertile (CDC, 2015; Deka & Sarma, 2010; Griel et al., 2011). Moreover, women were also reported to experience higher levels of infertility stigma and stress than their male counterparts (Deka & Sarma, 2010; Griel et al., 2011). I also chose to focus on advanced infertility treatment because the literature suggested that women who undergo advanced infertility treatment report significantly higher psychological distress than the general population (Damti, Sarid, Sheiner, Zilberstein, & Cwikel, 2008; Greil et al., 2011). Although there is extensive quantitative and qualitative research on the emotional effect of the infertility experience, there is a lack of literature on the subject of infertility and PTSD (Griel et al., 2011). Nevertheless, the call for further investigation on the relationship between infertility and PTSD was indicated throughout the reviewed literature (Griel et al., 2011).

A quantitative nonexperimental static-group comparison and correlational research study was utilized for the study because it allowed for comparison of two groups of individuals in which one group had participated in an assessable program (Szafran, 2007). In the present study, the identifiable programs were infertility treatment and

psychological intervention. Additionally, the correlation determined the possible relationship between the variables (Belli, 2008).

A factorial ANOVA was relevant for the research study because I was interested in examining the effect of the independent variables, fertility treatment and therapy intervention, on the dependent variable, PTSD, concurrently. Additionally, a multiple linear regression was used to determine and explain differences in the reported PTSD scores (McDonald, 2014).

Limitations

The study was limited by several factors. First, due to lack of prior research studies on the topic of infertility and its relationship with PTSD, supporting current research was limited; however, the absence of this literature also indicated the need for further research for the identified growing population. Additionally, because the collection of data was self-reported, it is possible that the results was influenced by participant bias and that individuals may not have answered honestly, may have exaggerated, and/or had selective memory (Pannucci & Wilkins, 2010).

Although efforts were made to gain representation of participants throughout the United States, I am not certain that the results are not specific to a certain geographic area, nor can I assert that medically diagnosed infertile women who cannot afford infertility treatment are represented.

Even though a quantitative study provides statistical data on the studied phenomena, full understanding of the phenomena is limited (Bernard, 2011). In addition, the nonexperimental design has its limitations, for according to Bernard (2011), it fails to provide enough data to draw a conclusive conclusion. Furthermore, in static-group

comparison, the inability to pretest is said to present an added limitation (Gustafson & Smith, 1994).

Significance

This research study aimed to provide information on the psychological impact of infertility and its treatment reported by De Berardis et al. (2014) and the possible prolonged effects suggested by Verhaak et al. (2007), Cousineau and Domar (2007), Schmidt (2009), Deka and Sarma (2010), and Begum and Hasan (2014). I also aimed to address infertile women's perceived heightened stress levels, as discussed by Psaros et al. (2014), and to determine the effect of psychological intervention, particularly during advanced infertility treatment (Delaney, n.d.; Espada & Moreno-Rosset 2008; Psaros et al., 2014).

My study may be beneficial to the field of women's health and reproductive medicine, in that it may enhance knowledge of infertility diagnosis and psychological effects in relation to possible long-term issues with infertility treatment for the 7.4 million women who have used infertility services (CDC, 2015). Furthermore, my study could be beneficial to reproductive health care providers and to the 1.5 million medically diagnosed infertile women, as it might provide necessary information on the various psychological effects and psychological risks of advanced fertility treatments (CDC, 2015). My study might also heighten awareness among reproductive healthcare providers and medically diagnosed infertile woman to equip a counterattack to possible PTSD susceptibility. For future researchers, my study could provide baseline information on the relationship between an infertility diagnosis, fertility treatment, psychological intervention, and PTSD.

Summary

Infertility affects up to 15% of reproductive-aged couples worldwide and is recognized as a medical condition (Ali et al., 2013; World Health Organization, 2015). Klock (2011) and Lee et al. (2001) suggested that an infertility diagnosis derails an individual from meeting an important life goal. Researchers have described the trauma of infertility as invisible and have suggested that as soon as an individual is informed of his or her new condition, it triggers a traumatic event (Jaffe & Diamond, 2011).

Although assisted reproductive treatment can improve individuals' chances of fulfilling their dream—and, for some, their female role expectation—researchers have found that stress levels in women receiving in-vitro fertilization are equivalent to those of women with cancer, AIDS, and heart disease (Domar et al., 1993; Frederiksen et al., 2015). Researchers have also suggested that women who have failed fertilization treatment continue to experience extreme guilt, isolation, depression, and powerlessness 3-5 years after the end of their treatment (Kaliamata, Mihlen-Fahlquist, & Roeser, 2011; Schmidt, 2009). Although psychotherapy may be beneficial in helping to alleviate the emotional impact of infertility treatment, its implementation is not a requirement (Jafarzadeh-Kenarsari, Ghahiri, Habibi, & Zargham-Boroujeni, 2015). Thus, the purpose of this research study was to answer the following question: Does advanced infertility treatment and psychological intervention affect PTSD symptoms in the medically diagnosed infertile woman?

Little is known about the impact of an infertility diagnosis, the experience of treatment, or the long-term psychological effects of infertility and treatment. However, researchers have indicated that the diagnostic population for PTSD should include

women who are infertile (Schwerdtfeger & Shreffier, 2009). In Chapter 2, I clarify the concepts introduced in this chapter through an in-depth review of literature of previous studies, and I address the gap that remains in the literature involving the relationship between infertility, fertility treatment, psychological interventions, and PTSD.

Chapter 2: Literature Review

Introduction

Data suggest that infertility has always been a major issue; however, according to Dubin (1996), it only became a social and medical concern in the 1800s. In the 1930s, reproductive experts (REs) began to consider the woman's reproductive system and its contribution to infertility. The first female fertility drug was introduced in the 1960s (Dubin, 1996). Even though both men and women may be diagnosed as infertile, according to Dubin female infertility causation is often the primary focus. Dubin and others have suggested that this phenomenon is due to the woman's social identity expectation and may be blamed on how her career, education, and other life events may get in the way of her becoming pregnant (Berger, Paul, & Henshaw, 2013; Pedro, 2015).

Morshed-Behbahani, Mossalanejad, Shahsavari, and Dastpak (2012) stated that because the desire to have a child is an expression of a human being's motivation to continue life, infertility is a significant problem and the stigma associated with infertility is traumatic. Additionally, Huang (2013) defined the failure to get pregnant as reproductive trauma. Deka and Sarma (2010) and Volgsten, Svanberg, and Olsson (2010) stated that a woman's feelings about her inability to fulfill her female role are a contributing factor to her traumatic experience. Jaffe and Diamond (2011) further stated that increased levels of anxiety are reported in infertile women as soon as they receive an infertility diagnosis. The increased level of stress may trigger a traumatic event, due to the individual's acute awareness of what the diagnosis means (Jaffe & Diamond, 2011).

Although a diagnosis of infertility can be traumatic, many women seek infertility treatment to achieve their strong desire for motherhood (Haelyon, 2010). Fertility

treatments are designed to assist the infertile woman in attaining pregnancy, but infertility treatment is also reported to increase stress levels (Haelyon, 2010). Domar et al. (1993) and Frederiksen et al. (2015) suggested that the stress level in women receiving infertility treatment is equivalent to that of women with cancer, AIDS, and heart disease. Haelyon (2010) and Morshed-Behbahani et al. (2012) indicated that the notably increased levels of stress and emotional fragmentation in women who receive fertility treatment can be attributed to constant reminders of their inability to become pregnant and/or repeated failure to achieve their goal of becoming a mother. As the stress associated with infertility has been linked specifically to the treatment of infertility, Jessup (2005) and Morshed-Behbahabi et al. (2012) asserted that infertility diagnosis, treatment, and experiences affect and diminish the infertile individual's self-worth and her conceptions of femininity.

Although case studies have suggested a link between the development of PTSD and infertility treatments, no studies have examined the relationship or its long-term effects (Gise, 1997). Gise (1997) stated that anecdotal reports link the stress of trying to overcome infertility to the stress response associated with PTSD symptoms. Jaffe and Diamond (2012) indicated that the effect of an infertility diagnosis is in alignment with the physical, cognitive, and emotional reactions of a person suffering from PTSD. Newly diagnosed infertile women have reported constant fear of never having a child and being affected by anything that reminded them of their diagnosis (Jaffe & Diamond, 2012). Additionally, in a 20-year postinfertility treatment study conducted with 14 involuntarily childless women, Schwerdtfeger and Shreffler (2009) stated that the women continued to

report feelings of low self-esteem and social isolation and admitted to continued thoughts about their childlessness.

Although studies exploring the psychological effects of an infertility diagnosis and experience have reported psychological symptoms that meet the criteria for a PTSD diagnosis, presently there are limited to no published studies linking PTSD to infertility. Schwerdtfeger and Shreffier (2009) suggested that because there is a lack of studies on the impact of infertility and its treatment, more studies that address the psychological consequences of treatment as well as the long-term effects of treatment on infertility are needed. Schwerdtfeger and Shreffier also stated that further research is required to define the significant and enduring psychological consequences of reproductive problems. While Grell (1997) concluded that both quantitative research and qualitative research have contributions to make to the understanding of the experience of infertility, Schwerdtfeger and Shreffier suggested that more research needs to focus on the effects of the duration of infertility, the experience of treatment, and how the two affect one another. Due to the lack of studies in this area, some of the literature reviewed in this study is more than 10 years old; due to the research content and findings, it is important to consider this older research.

The purpose of this quantitative nonexperimental research study was to determine the potential functional relationship between infertility and PTSD. Specifically, the relationship between infertility diagnosis, fertility treatment, lack of therapeutic intervention, and PTSD symptoms in medically diagnosed infertile women in the United States was explored. With the intent to understand the effect and the relationship, I compared self-reported PTSD symptoms between four subgroups: (a) medically

diagnosed infertile women who received advanced infertility treatment, (b) medically diagnosed infertile women who did not receive advanced infertility treatment, (c) medically diagnosed infertile women who received psychological intervention during advanced infertility treatment, and (d) medically diagnosed infertile women who did not receive psychological intervention during advanced infertility treatment.

In this chapter, I review the concept of the traumatic event caused by an infertility diagnosis as described by Jaffe and Diamond (2011) and the psychological effects of this event on women undergoing advanced infertility treatment. I review literature on individuals experiencing PTSD and examine the effect of psychological intervention for medically diagnosed infertile women who have undergone infertility treatment. Additionally, the two theoretical foundations of this study, Janoff-Bulman's cognitive appraisal theory and Cobb's social support and stress buffering theory, are discussed. Following these sections, studies that emphasized infertility diagnosis, infertility treatment, and psychological intervention in regard to PTSD are discussed, followed by a summary of the chapter.

Literature Search Strategy

The resources I used for this literature review included online databases such as Academic Search, ERIC, EBSCO, Google Scholar, PsychArticles, PsycINFO, Scholarly Journal, and ResearchGate; I obtained all sources using Walden University's digital library. As infertility is a highly regarded field, research from psychological journals, medical journals, and related scholarly and APA books, magazines, and newsletters was used. All materials were referenced regardless of publication date in order to establish

background on the topic; I also used reference lists from articles found in the literature search as a source for articles.

The key terms used for the literature search included *infertility, PTSD, psychosocial, depression, emotional health, stress, anxiety, trauma, IVF, shattered assumption, trauma, stress buffering, Cobb,* and *fertility treatment*. I also used combinations of terms such as *advance fertility treatment* and *PTSD; infertility diagnosis* and *PTSD; stress* and *PTSD; medical conditions* and *PTSD; cancer* and *PTSD; HIV* and *PTSD; reproduction* and *PTSD; infertility* and *stress; infertility* and *isolation; reproductive trauma, social, stress, infertility,* and *buffering;* and *infertility* and *psychological intervention* in my quest to obtain knowledge on the relationship between infertility and PTSD. The scope of the literature ranged from Cobb (1976) to the World Health Organization (2015).

Theoretical Foundation

Cognitive Appraisal Theory: Shattered Assumptions

The theoretical framework for this study consisted of Janoff-Bulman's (1992) cognitive appraisal theory known as *shattered assumptions* and Cobb's (1996) stress-buffering theory. Janoff-Bulman's cognitive appraisal theory addresses beliefs about the self, the future, the world, and trauma's insult to meaning systems. It suggests that traumatic events damage individuals' benevolent perceptions of self and the world as they know it (Edmindson et al., 2011; Janoff-Bulman, 1992; Park et al., 2012). According to Janoff-Bulman's theory, a traumatic event causes a loss of control and stability in a person's current belief system (Edmindson et al., 2011; Janoff-Bulman, 1992; Park et al., 2012).

Janoff-Bulman's theory provides details on individuals' assumptions in relation to their worldview and how a worldview provides the individual with meaning, self-esteem, and the illusion of invulnerability. The theory suggests that when a traumatic event violates a person's worldview, the individual can no longer perceive the world as benevolent or predictable, nor the self as competent or invulnerable (Park et al., 2012). Eventually, one's inability to integrate the traumatic experience into one's worldview causes a weak, terrified, and confused reaction, which creates awareness of one's own mortality. In this situation, according to Janoff-Bulman (1992) and Edmindson et al. (2011), the individual may form symptomology that coincides with PTSD.

Janoff-Bulman (1992) stated that there are three core assumptions held by most people about the world and themselves, which are shattered by traumatic events because assumptions co-exist with emotions. Labeling the three fundamental assumptions *the world is benevolent*, *the world is meaningful*, and *the world is worthy*, Janoff-Bulman argues that the "fundamental assumptions are the bedrock of our conceptual system" (p. 5).

The first assumption, *the world is benevolent*, involves how the individual feels about people and events in the world (Janoff-Bulman, 1992). The theory indicates that most people believe that other people are "basically good, kind, helpful, and caring" (p. 6) and that positive events highly outweigh the misfortunes of the world. *The world is meaningful*, the second assumption, suggests that there is a reason that things happen to people (Janoff-Bulman, 1992). An individual making this assumption believes that good things happen to good people and bad things happen to bad people (Janoff-Bulman, 1992). Lastly, Janoff-Bulman's (1992) third assumption is that most people perceive

themselves as good, capable, and moral and thus believe that *the world is worthy*. This assumption identifies how people feel about themselves and involves their self-worth, self-judgment, and self-evaluation (Janoff-Bulman, 1992). Within the third assumption, individuals believe that they are competent and can control both positive and negative outcomes of life (Janoff-Bulman, 1992).

Janoff-Bulman's (1992) cognitive appraisal theory, shattered assumptions, is helpful when examining the relationship between infertility and PTSD, for an infertility diagnosis is often unexpected. Additionally, because the ability to conceive is often taken for granted, based on the arguments of Bliss (2009), Galhardo et al. (2011), and Janoff-Bulman (1992), the diagnosis of infertility may violate a person's worldview. It is reported that the self-worth and self-judgment of the infertile individual change as the individual shifts from feeling competent and worthy before a diagnosis to feeling incompetent, defective, and vulnerable after the diagnosis (Deka & Sarma, 2010). Additionally, Deka and Sarma (2010) suggested that the nonfulfillment of a significant transition into adulthood such as parenthood may produce feelings of worthlessness.

In agreement with Janoff-Bulman's cognitive appraisal theory, shattered assumptions, women who are diagnosed as infertile may no longer perceive the world as benevolent or predictable (Edmindson et al., 2011; Janoff-Bulman, 1992). As Rooney and Domar (2012) noted, infertile women report feelings of confusion. The authors indicated that this is because most women assume that they will have children when they grow up, and an infertility diagnosis causes a woman to question her female identity (Rooney & Domar, 2012). Additionally, the authors stated that an infertility diagnosis changes a person's self-perception (Rooney & Domar, 2012). For although a woman

might believe she is a good person, she might believe that an infertility diagnosis is a punishment for past events, such as indiscreet sexual behavior, an abortion, or use of contraception (Rooney & Domar, 2012).

Based on the theory of shattered assumptions, because an infertility diagnosis often comes as a surprise, it causes individuals' core belief systems about themselves and the world to shift. The infertility experience, which is often defined as trauma, may cause the infertile woman to doubt her competence, to feel vulnerable, and to feel as though her life is no longer in control. Due to the trauma of infertility diagnosis and treatment, Janoff-Bulman's shattered assumptions theory supports the notion that the experience could mimic PTSD.

Social Support & Stress-Buffering Theory

Cobb's (1976) social support and stress-buffering model indicates how supportive social relationships assist an individual in coping with stressful events and prevent a person from experiencing deleterious outcomes. According to Cobb social support begins in utero and progresses throughout life as support is derived increasingly from outside influences, including, but not limited to, helping professionals. Cobb asserted that although a person's support system might change during his or her lifetime, the individual's need for support increases with unexpected life crises Cobb also theorized that social support protects the individual against health problems that are associated with stress. According to Cobb the support of others not only assists the individual in coping with and mastering problems, but also accelerates the person's path to recovery from a traumatic experience.

Numerous studies support Cobb's social support and stress-buffering theory. Colin and Wills (1985) stated that persons with spouses, friends, and family members who provide social support are in better health than those with fewer supportive social contacts. Oginska-Bulik (2015) suggested that social support is essential to dealing with and healing from trauma, and DeLong (2012) concluded, in a study that measured the importance of PTSD and social support, that women were more vulnerable to PTSD symptomatology after a traumatic event due to lack of positive social support.

Previous studies have reported that infertile individuals' feelings of shame and grief decrease their ability to discuss their condition with family and friends (Huang, 2013; Jessup, 2005; Rosen, 2005). Additionally, witnessing peers achieving motherhood through the expected route of parenthood has been said to increase detachment and isolation behavior in the infertile woman (Huang, 2013; Jessup, 2005; Rosen, 2005). Haelyon (2010) further stated that although infertility treatment provides hope for the infertile individual, treatments might also be a continuous reminder of the infertile person's inability to become a mother, leading her to feel as though she no longer belongs and causing her to detach and isolate herself from others. Gise (1997) defined the infertile woman's reported behavior as avoidant. Jahromi and Ramezanll (2014) observed that even though the need for emotional-coping skills increases for an infertile woman, isolation may hamper her ability to think reasonably and maintain problem-solving coping strategies. Berger et al. (2013) and Pedro (2015) stated that an infertile woman's avoidant behavior will trigger increase feelings of shame and low self-esteem, ultimately hindering the infertile individual's ability to cope with the stress of her unexpected experience (Jahromi & Ramezanll, 2014).

Cobb's social support and stress-buffering theory indicates that if a medically diagnosed infertile woman does not gain an increased amount of social support from the initial infertility diagnosis throughout her infertility treatment, she may experience life-threatening psychological and/or medical consequences that include, but are not limited to, PTSD. The social support and stress-buffering model supports the assumption that the medically diagnosed infertile woman may experience recovery from this traumatic event if she maintains a healthy support system to assist her in regaining her sense of self-worth, her ability to think, and her ability to maintain and increase her coping skills. Lastly, Cobb's theory suggests that lack of social support from infertility diagnosis throughout fertility treatment and the infertility experience increases the medically diagnosed infertile woman's exposure to PTSD symptomatology.

Taking into account Janoff-Bulman's shattered assumptions theory and Cobb's social support and stress-buffering model, the theoretical framework for this research study was based on the supported principle that parenthood represents a significant transition in adult life. The stress of the nonfulfillment of the wish for a child may produce anger, depression, anxiety, marital problems, and feelings of worthlessness in the infertile individual and may be disruptive to the person's worldview. A better understanding of medically infertile individuals' experiences of disruption and need for social support due to the traumatic experience of infertility diagnosis and treatment is necessary in order to comprehend the long-term psychological impact of infertility. Lastly, it is important to understand medically diagnosed infertile individuals' inability to thrive, as well as PTSD symptomatology and PTSD risks, which are increasingly reported for the infertile population.

Infertility

Infertility is defined as the inability to conceive a child after one full year of having unprotected sex and is reported to be a common problem in women between the ages of 15 – 44 (Ali et al., 2013; World Health Organization, 2015). The primary cause of female infertility is associated with problems with ovulation, and linked to *polycystic ovarian syndrome* (PCOS) and *primary ovarian insufficiency* (POI) (Womenshealth.gov, 2012). "PCOS is an endocrine-metabolic disorder characterized by multiple hormonal imbalances, reflecting on a clinical presentation dominated by manifestations of hyperandrogenism, which generate short and long term consequences on female health" (Rojas et al., 2014, p. 1). Additionally, Rojas et al. stated, PCOS affects 48.5 million women between the ages of 20 - 44 years of age. POI is defined as premature menopause and happens when women age 40 or younger no longer have a menstrual period (Cox & Liu, 2014). Other causes and or risk of infertility problems include, but are not limited to, block fallopian tubes, uterine fibroids, age, stress, poor diet, and sexually transmitted infections (Womenshealth.gov, 2012).

For a woman to receive an infertility diagnosis, she is subject to a battery of tests that include, but are not limited to a physical exam, ovulation testing, a *Hysterosalpingography* (HSG), and or a *laparoscopy* (Womenshealth.gov). The American Society for Reproductive Medicine (2015) defines an HSG as an x-ray procedure that views the infertile woman's fallopian tubes and uterus. A Laparoscopy or laparoscopic surgery is a procedure where a tube is placed through a small incision in the woman's belly to see inside the abdominal walls of the female pelvic organs (Nakamura et al., 2016; Womenshealth.gov). The objective of both procedures is to see if and how

the woman's reproductive organs are functioning (Nakamura et al.,; Womenshealth.gov). Following the battery of tests, and depending on the results and the severity of the individual diagnosis, the patient considers her family building options, which may include, but are not limited to, ART (CDC, 2015; Womenshealth.gov). ART can include one or a combination of *Intrauterine insemination* (IUI), *In-vitro fertilization* (IVF); *Zygote Intrafallopian Transfer* (ZIFT); *Gamete Intrafallopian Transfer* (GIFT); *Intracytoplasmic Sperm Injection* (ICSI), and third party donors (CDC; Womenshealth.gov).

ART is all fertility treatment that includes the handling of human oocytes and sperm or embryos (CDC). An *IUI* is a clinical procedure where the sperm is inserted into the natural opening of the uterus, and deposited directly into the uterus using a catheter for the purpose of attaining a pregnancy (Wisot & Meldrum, 2004). *ICSI* is a laboratory procedure where a single sperm is injected directly into an egg cell for the purpose of achieving fertilization inside a petri dish (Wisot & Meldrum). Burns and Covington (1999) defined *IVF*, as the laboratory procedure, in which fertilization is attempted by placing many sperm cells in the unfertilized eggs outside the woman's body. Once the eggs are fertilized, they are transferred back into the woman's uterus. ZIFT and GIFT are similar to IVF; however, IVF is reported to be the most commonly used and most effective method of infertility treatment (Burns & Covington, 1999).

In 2014, 460 fertility clinics in the United States reported performing 208,786 assisted reproductive treatment (ART) cycles (CDC, 2016). Out of the 208,786 reported performed cycles, 57,332 resulted in live births (CDC). It is also important to note, 35,424 of the 208,786 ART cycles were intended for cryopreserving (freezing) for future

ART (CDC; Wang & Sauer, 2006). The CDC stated they did not expect any of the frozen eggs or embryos to result in a pregnancy or birth. The total number of live birth infants (70,352) include singletons, multiples, and third party donor cycles (CDC).

According to Devi, Chatterjee, Rajyalaksmi, Navatha, and Arshiya (2011), the first ART baby was born with the assistance of IVF and an unstimulated (drug-free) menstrual cycle. However, today, the typical IVF protocol is complex and can take several weeks (Devi et al., 2011). The typical IVF protocol usually begins with the infertile individual taking fertility medication between day three and day 25 of her menstrual cycle, with hopes to stimulate egg production and increase the size of the follicles (Devi et al.). There are several different types of fertility medications available and considered depending on the person and the intent (CDC). The list includes, but are not limited to, Clomid, Human menopausal gonadotropin (hMG), Follicle-stimulating hormone (FSH), Gonadotropin-releasing hormone (Gn-RH), and Metformin (CDC). The medications are taken by mouth, injected into the woman's body, or taken as a nasal spray, and intended to either stimulate ovulation or lower the male hormones that are found in some infertile women (CDC).

Rather stimulated or unstimulated, follicle drugs are used in an IVF cycle, the infertile woman's egg production is monitored by ultrasound and/or blood test, and sometimes requires daily office visits (Devi et al). If egg production is successful and the follicles meet the intended size, they are surgically retrieved from the infertile woman's ovaries, and combined with the sperm in the laboratory (Devi et al.). If the fertilized stimulated eggs are hyperstimulated or premature the IVF cycle is canceled. If fertilization does take place, (usually 35 hours after retrieval) the embryo(s) are then

surgically transferred back into the woman's uterus through the woman's cervix or into her fallopian tubes (Devi et al.).

Although fertility treatment increases the woman's chance of pregnancy, it also increases the chance of multiple births, premature births, and developmental problems in the fetus (CDC, 2015; Womenshealth.gov, 2012). Infertility treatment is also reported to be expensive, time-consuming, uncomfortable, and has uncertain long-term health consequences (CDC; Womenshealth.gov). Additionally, several researchers suggested the medical diagnosed infertile woman's emotional stress level is equivalent to the stress levels found in individuals facing life-threatening diseases (CDC; Devi et al.).

In-Vitro Fertilization

Although the IVF fertility procedure takes place outside of the women's body, the IVF fertility protocol takes approximately 2-4 weeks and is dependent on the individual's drug regiment (Lundborg et al., 2014; Okwelogu et al., 2012). As IVF has proven to be the most effective form of fertility treatment, it has also been reported to cause the greatest amount of emotional distress, and is said to be a social, psychological and financial costly burden (Carter et al., 2011; Lundborg; Okwelogu et al.,; Verhaak et al., 2007). Furthermore, each stage of the IVF treatment has been reported to increase the infertile woman stress levels, and according to researchers, the physical and emotional experience of IVF treatments creates a fight or flight reaction (American Society of Reproductive Medicine, 2013; Layyous, 2013; Lopez, 2013).

Lukse and Vacc (1999) researched the emotional impact of infertility treatment in women undergoing IVF and ovulation induction. Two groups were compiled; one group consisted of 50 women undergoing IVF treatment, and the other group consisted of 50

women receiving ovulation-induction medication. Both groups studied by Lukse and Vacc showed increased signs of distress and depression before during and after treatment. Lukse and Vacc suggested the increase was not conclusive to previous failed IVF cycles or other external economic and or social factors. As stated earlier, although Lukse and Vacc study is more than 10-years old, I think it is important to be considered within the body of this literature review, because it was the only study I was able to locate that examined the infertile woman's emotional well-being, before during and after treatment.

Verhaak et al. (2007) conducted a study of 298 infertile women undergoing IVF and in-tra cytoplasmic sperm injection (ICSI) treatment for the first time. The purpose of the study was to find out if there were long-term psychological effects in women who had undergone IVF and ICSI fertility treatment (Verhaak et al.). All the participants in the study group showed elevated anxiety and depression during treatment. The researchers reported that the group of women who had not achieved pregnancy had not developed the ability to accept their inability to get pregnant and continued to show signs of heightened anxiety, unlike the group of women who had achieved a successful live birth (Verhaak et al.).

Kraaij, Gamefski, and Schroeversal (2009) studied individuals who were actively involved in fertility treatment hoping to understand the relationship between cognitive-behavioral patterns, and depression, and anxiety. The Hospital Anxiety and Depression Scale, the Cognitive Emotion Regulation, and the, Goal Obstruction Questionnaire was administered to measure the cognitive-behavioral coping skills and the levels of anxiety and depressive symptoms of the 313 participants. Seventy-eight percent of the participants were female, and the average age of the studied group was 35 years. Based

on the results, the researchers suggested stress and anxiety are higher in individuals undergoing infertility treatment, and the onset of stress and anxiety effects coping reactions of the individual and possibly the ability to reach life goals.

Additionally, based on a study of 291 infertility patients undergoing IVF and ICSI treatment, Smeenk et al. (2000) also reported increased levels of anxiety and suggested it decreases the individuals chance of pregnancy. Smeenk et al. reported that the elevated state anxiety levels were above the tested measures of depression and suggested that the findings were more apparent during the implanting stage.

Vikstrom, Josefsson, Bladh, and Sydsjo (2015) conducted a 20 – 23 year follow-up study of 504 women who had at least undergone one infertility treatment. The demographics of the participants consisted of mostly women over the age of 45 (n = 289), as well as, women who successfully got pregnant who all reported that they were still with their same partner (Vikstrom et al.). Women who had an unsuccessful pregnancy and either remained childless and reported being divorced or separated, and women who adopted, and reported being married or cohabitating (Vikstrom et al.). The authors stated that the self-perceived mental health of the participants ranged from no feelings of depression to feelings of depression, anxiety, and obsessive-compulsive problems (Vikstrom et al.). The women who had not successfully got pregnant and were over the age of 45 reported higher levels of anxiety, depression and other somatic symptoms than the woman who either became a mother through fertility treatment or adoption (Vikstrom et al.). However, in comparison to a reference group (156 aged matched women), all the IVF participants' depressive, obsessive-compulsive and somatization symptoms were higher (Vikstrom et al.).

It is important to note researchers suggested the stress reported by the infertile woman undergoing IVF treatment is comparable to those diagnosed with life-threatening diseases that have also been linked to PTSD (Deka & Sarma, 2010; Domar et al., 1993; Grell et al., 2011; Mosalanejad & Koolee, 2013; Zaig et al., 2012). Gise (1997) suggested the shock, disbelief, helplessness and loss of the ability to procreate and the loss of hope for children triggers a stress response that can develop into PTSD. The author discusses the infertile patients classic PTSD symptoms, such as re-experiencing the trauma, flashbacks, and intrusive thoughts about distressing procedures or pregnancy (Gise).

In summary, due to the significant rise in infertility diagnosis, REs have developed many ART methods with hopes to assist the infertile individual to bear biological children. IVF has been noted to be not only the most common method of treatment choice, but also the most effective. However, it has been reported; even the most efficient treatment endeavor also comes with many risks. Risks that include but are not limited to low self-esteem, depression and isolation. IVF has also been reported to be the most evasive and stress provoking treatment. Research indicated that the infertile individuals symptomatology escalates to include paranoid ideation, interpersonal strain, major depressive disorder, mood disorder, dysthymia and creates a fight or flight reaction and continues throughout the individual's treatment protocol. Lastly, researchers have suggested the psychological effect of IVF treatment goes beyond treatment and has also compared IVF to match the stress levels of individuals faced with chronic illnesses and PTSD.

Psychological Impact of Infertility Treatment

As the above literature indicates, although infertility treatments are reported to be effective, the chronic stress related to the treatment has been reported to cause feelings of guilt, depression, isolation, low self-esteem, irritable and avoidant behavior, and social isolation (Begum & Hasan, 2014; Domar & Gordon, 2011; Kamel, 2010; Klock, 2011; Newton, Sherrard, & Glavac, 1999). Additionally, Kee, Jung, and Lee (2000), Begum and Hasan and Ramezanzadeh, Noorbala, Abedinia, Forooshani, and Naghizadeh (2011) added aggression, anxiousness, loss of beliefs, psychosomatic complaints, obsession, and relationship difficulties to the infertile individuals reported experiences. As Jaffe and Diamond (2010) suggested that the traumatic experience of infertility is not only devastating, but also promotes a loss of innocence and trust in the pregnancy process. The researchers also indicated that the infertility experience creates a long-lasting effect on the patients secure sense of self and hope of pregnancy (Jaffe & Diamond). Hammerli, Znoj, and Barth (2009) and Carter et al. (2011) stated the anxiety and depressive levels displayed by the individual undergoing infertility treatment is equal to that of the chronically ill person. Additionally, in a study of 200 infertile participants, more than 64% of the individuals reported that the infertility experience was the single most stressful event in their lives (Freeman, Boxer, Rickels, Tureck, & Mastroianni, 1985).

Begum and Hasan conducted a comparative study to explore the difference between anxiety and depression in 120 fertile and infertile women, and the authors reported significantly high clinical findings of major depressive disorder, mood disorder, dysthymia, and anxiety in infertile women following infertility treatment. The self-reported questionnaire addressed areas such as the prevalence of feelings and experience

at the time the participants were trying to conceive, the perceived impact on the interpartner relationship, and the severity of life events and the patient's current well-being (Odd, Den Tonkelaar, & Nieuwenhuyse, 1999). After investigating the negative emotional and psychosocial impact of infertility in 570 women waiting or being prepared for assisted reproductive treatment, Odd et al. stated that the individual's psychological well-being deteriorated after unsuccessful treatment cycles. All the participants reported that the infertility life event was severe .

Berg and Wilson (1991) focused specifically on the infertile person's psychological functioning across stages of infertility treatment. The authors concluded that the fluctuations in psychological functioning over the course of medical infertility treatment is significant and stems from the onset of the infertile diagnosis to the repeated attempts of treatment and increases symptoms such as paranoid ideation, interpersonal strain and depressive symptoms (Berg & Wilson). Baghianimoghadam et al. (2013) and Smeenk et al. (2001) both suggested the added stress of the non-fulfillment of the wish to have a child, as well as the prolonged exposure to invasive infertility treatments, promotes numerous psychological and social problems for the infertile patient.

Lastly, the psychological wellbeing of the infertile woman is also compromised when she chooses to undergo advance fertility treatment. For according to the American Society of Reproductive Medicine (2013) and Lykerldou (2009), dealing with the medical staff, the side effects of medication, the time commitment, and the waiting period are additional contributing factors that inhibit the infertile woman's psychological well-being. Thus, because the psychological interventions paired with the individual's infertility protocol can decrease the reported PTSD like symptoms in the infertile woman,

further investigation was warranted of the potential functional relationship (Frederiksen et al., 2015; Zaig et al., 2012).

Posttraumatic Stress Disorder

Due to the increase psychological symptoms indicated to be associated with an infertility diagnosis and in-vitro fertilization treatment, the medically diagnosed infertile woman who undergoes infertility treatment, might be at risk for Post Traumatic Stress Disorder (PSTD). Swiss military physician Dr. Johannes Hofer first identified PTSD in 1668 (Bentley, 2005). The symptoms included incessant thinking of home, disturbed sleep or insomnia, weakness, loss of appetite, anxiety, cardiac palpitations, stupor, and fever (Bentley). According to Bentley, Hofer interpreted the soldier's condition as being homesick (Bentley). French and Spanish physicians later redefined the behavior as *estar roto* meaning it be broken (Bentley). In 1727, according to researchers, a French surgeon, Dominique Jean Larrey identified PTSD as having three separate stages (Bentley; Ficocelli & Mardon, 2013; Nestor, 2012). The stages included heightened excitement, imagination, fever, gastrointestinal symptoms, frustration, and depression (Ficocelli & Mardon, 2013). PTSD was looked at as a functional disability, and suggested to be a typical result of the battle and the stresses of military life (Bentley). In the 1800s is when civilians began to report similar PTSD symptoms, and, according to Bentley and Ficocelli and Mardon, the effects of the trauma were discounted. For both the civilian and young soldiers were accused of malingering by the assistant surgeon general (Bentley).

Bently indicated that the soldiers' emotional build up of stress, the fear of the unknown, and the reported hallucinations were due to the lack of a permissible emotional outlet, the inability to defend, and exhaustion. In 1905, the Russian army was "the first

army in history to determine that the mental collapse was a direct consequence of the stress of war and the legitimate medical condition" (Bentley, para. 26). According to Bentley, PTSD became known as Shell Shock, for it was believed the physiology of the brain had been disrupted by the impact of the shells, causing a concussion (Bentley; Ficocelli & Mardon). It was not until after World War I that clinicians began to understand the symptoms being reported were not due to brain damage, but was an emotional condition (Bentley; Ficocelli & Mardon). "PTSD cannot be all in your head because unfortunately in order to become a victim of PTSD, trauma has to occur" (Ficocelli & Mardon, p. 16)

Today, PTSD is diagnosed in patients with persistent psychiatric distress resulting from events involving actual or threatened death or injury (APA, 2013). The Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-5) states PTSD includes four symptom clusters (Criterion A, B, C, and D), and the individual diagnosed with PTSD must meet their specific symptoms and stipulations (APA). The four symptom clusters include, but are not limited to: repeated or extreme exposure to aversive details of an event or events, intense or prolonged distress, trauma-related thoughts or feelings, and detachment and estrangement from others (APA). Additionally, Criterion E: alterations in arousal and activity, F: duration, G: functional significance and H: exclusion (disturbance is not due to substance use, medication, or other illness) must also be met (APA). In addition to meeting the diagnostic symptom and stipulation criterion, the treating clinician must also specify if the individual reports experiencing high levels of either depersonalization or derealization (APA). Lastly, a full diagnosis of PTSD is not determined until at least six months after the traumatic event occurred (APA).

PTSD and Medical Conditions

Ficocelli and Mardon (2013) stated PTSD was first identified as a legitimate medical condition in 1905, since the medical identification, some researchers have studied PTSD and its relationship with many chronic medical illnesses. Posluszny et al. (2011) linked the cause of PTSD to a person's medical illness and stated the severity of the person's disease does not predict the level of a person's risk for PTSD. Mundy and Baum (2004) suggested the medical diagnosis and the link to PTSD might be associated due to changes in endocrine, immune system changes, cognitive distress, and existential anxiety. The authors suggested that the diagnosis or treatment of the illness might cause the changes because it signifies a direct threat that modifies the individual's worldview (Mundy & Baum).

Researchers investigated the relationship between PTSD and patients with cancer, HIV, and AIDS (Campbell et al., 2008; Duffy, Allen, & Clark, 2005; Meltzer-Brody et al., 2007). Scott (2015) stated, "before 1994; cancer patients were specifically excluded from the psychiatric definition of PTSD" (para. 2). For, according to Arnaboldi et al. (2014), before 1994 APA did not recognize cancer as a life-threatening traumatic stressor. Additionally, Scott suggested the exclusion of cancer patients from a PTSD diagnosis increased their mortality rates. However, a PTSD diagnosis is still seldom given to cancer patients, although, cancer patients often report PTSD symptoms (Scott). Scott also stated a cancer patient's inability to get over what has happened to them is inevitable, and the fear of remission has driven cancer survivors to commit suicide.

In a seven-year post-diagnosis study of 566 non-Hodgkin's lymphoma (NHL) individuals, 37% of the respondents reported persistence or worsening of PTSD

symptoms, 12% reported at least one resolution symptom, and 51% reported no PTSD symptoms at all (Smith, 2011). Armaboldi et al. (2014) suggested that there is a high prevalence of PTSD symptoms in newly diagnosed breast cancer patients. However, Palmer, Kagee, Coyne, and DeMichele (2004) disagreed with the argument and stated, although 41% of their consecutive breast cancer patients reported intense fear, helplessness or horror, only 4% met the DSM-IV criterion for PTSD.

According to authors, when PTSD was classified as a medical condition many researchers were motivated to examine the relationship of PTSD with various chronic medical illnesses, including cancer, which had specifically been excluded from a PTSD diagnosis. Researchers believe now that the life-threatening stressor has been recognized the mortality rates of cancer patients have increased. Some researchers indicated that the stressor is due to the medical diagnosis, which changes the person's worldview and provokes physiological shifts in the cancer patient and increases the individuals PTSD symptomatology. Although research indicated inconsistent findings, all the reviewed authors agree that some PTSD symptoms are reported amongst their participants.

HIV and AIDS. Similar to cancer, researchers have also linked the relationship between PTSD and HIV and AIDS (Campbell et al., 2008; Duffy et al., 2005; Meltzer-Brody et al., 2007). Martin and Kagee (2011) aimed to determine the rate of lifetime PTSD and the incidence of HIV-related PTSD. The findings suggested an existing relationship between PTSD and HIV-positive individuals and the studied population (n = 46/85, 54.1%) met the DSM-IV criteria for lifetime PTSD [95% CI, 43.6 – 64.3%] (Martin & Kagee). Additionally, "forty percent (95% CI, 30.2 – 50.6%) of the total sample met criteria for HIV-related PTSD" (Martin & Kagee, p. 129).

In a study of 210 diagnosed HIV individuals, researchers indicated that the perceived HIV-related stigma increases the PTSD symptoms in the HIV individual (Breet, Kagee, & Seedat, 2104). Additionally, Rzeszutek, Oniszczenko, Schier, Biernat-Kaluza, and Gasik (2015) suggested that the HIV individual's PTSD symptoms might be connected to the chronic pain associated with the disease, and it is that which affects the HIV individual's normal social function. The authors also stated that it is the individual's impaired social function that weakens the support system leaving the HIV person without a buffer and increases his or her risk to PTSD (Rzeszutek et al.).

Since the identification of PTSD a medical condition, many researchers have explored its relationships with various chronic medical illnesses, such as cancer, AIDS and HIV. Researchers have suggested the medical illness triggers a traumatic event, suggesting it might create a flight or flight response, which, in turns changes the individual's worldview. Studied cancer, HIV and AIDS individuals have been reported to meet the DSM criteria for PTSD, and some researchers reported higher prevalence in the said population. Additionally, researchers also indicated the lack of social support might increase the PTSD risk in the chronically ill person. As PTSD has been identified as a medical condition, based on patient's reported symptoms, researchers have broadened the exploration of the psychological impact of woman facing reproductive issues to include PTSD.

Abortion, Miscarriage, and PTSD

In a systematic review Daugirdaite, van den Akker, and Purewal (2015) aimed to "integrate the research on posttraumatic stress (PTS) and posttraumatic stress disorder (PTSD) after pregnancy termination, miscarriage, prenatal death, stillbirth, neonatal

death, and failed in vitro fertilization" (p.1). The authors concluded that PTSD does occur after nonmedical and medical termination of pregnancy, miscarriage, prenatal loss, and stillbirth (Daugirdaite et al.). However, the authors could not examine the relationship between infertility and PTSD for systematic research evidence was nonexistent (Daugirdaite et al.).

Biggs, Rowland, McCulloch, and Foster (2016) conducted a four-year, nine waves of interview study, with the aim to explore the risk of PTSD and the experience of Post-traumatic stress symptoms (PTSS) in 956 women who either had an abortion or were denied an abortion due to a gestational limit. The total number of participants retained throughout the four years differed; however the authors stated the rates attrition did not differ significantly (Briggs et al.). The retention rate was reported to go from 92% (n = 880) one week after abortion to 65% (n = 618) 4 years after abortion (Briggs et al.). Briggs et al. found that two in five women reported one or more symptoms of PTSD, and 16% scored high enough to be considered at risk of developing PTSD. However, in the 4-year follow-up, only about 1% (n = 8) of the women seeking an abortion or denied an abortion were at risk for PTSD symptoms or reported symptoms of distress (Briggs et al.). The authors indicated that the decrease percentage of women reporting symptoms of distress suggested that the psychological impact of the abortion had reduced overtime (Briggs et al.). The 8 participants who continued to report PTSD symptomatology, according to the authors, continued to also report the event as personal (Briggs et al.).

Coleman, Coyle, and Rue (2010) stated social concerns have a profound effect on the woman who are selecting to have abortions and stated 52.5% (early abortion group) and 67.4% (late abortion group) of their participants met the DSM-IV diagnostic criteria

for PTSD. Lastly, a meta-analysis study combined 22 studies (n = 877,181 total participants; n = 163, 831 women who had an abortion), the author concluded women who have abortions are 81% more likely to report some form of psychological problems (Coleman et al.).

Broen, Moum, Bodtker, and Ekeberg (2005) who explored the psychological link between abortion and miscarriages in 120 women (n = 80, abortion; n = 40, miscarriages) stated both groups are reported to have significantly higher depression and anxiety rates than the compared general population. However, the authors also indicated that the anxiety and depression rate is greater in the abortion population, suggesting it might be due to the guilt, shame, and avoidance reported by the abortion population (Broen et al.).

Additionally, Broen et al. stated like an abortion a miscarriage is a life event. However, the psychological experience differs, and can be contributed to the fact that an abortion is planned, where a miscarriage comes as a surprise (Broen et al.). The authors additionally stated although both groups measure high levels of anxiety in relation to the general population, the miscarriage group measured significantly higher feelings of grief (Broen et al.).

Miscarriage. Miscarriages are reported to be relatively common (10 – 20%) amongst clinically recognized pregnancies and defined as a "spontaneous termination of an intrauterine pregnancy before 28 weeks of gestation" (Geller, Kerns, & Klier, 2004, p. 35). With the increase of miscarriages over the last decade, research also has indicated a rise in the psychological impact. However, according to Geller et al., it is only recently that reported post-miscarriage anxiety and depression has received needed attention. Additionally, Geller et al. stated because the individual is not prepared the psychological

impact might be contributed to the traumatic event and increases the person's risk of PTSD symptomatology.

Research indicates individuals' who undergo reproductive complications have increased psychological problems and might be at risk for PTSD. Research also shows significantly higher levels of anxiety and depression were reported in women who had selective pregnancy termination and or had experienced a miscarriage than that of the general population, and the surprise element of a miscarriage adds to the individuals PTSD symptomatology. Researchers also stated further exploration is needed throughout all pregnancy trimesters to determine and explain the PTSD risk in the reproductive population, specifically, the systematic research evidence on the relationship between infertility and PTSD, which is said to be nonexistent. In turn, the long-term effect of an infertility diagnosis, infertility treatment, and its relationship to PTSD remain unanswered, as well as the effect of psychological intervention before, during or after an infertility diagnosis and treatment.

Psychological Intervention

According to the National Alliance on Mental Illness (NAMI, 2016), being led by a trained therapist to examine one's feelings and behaviors of the past and current problems and experiences, with hope to discover coping skills, defines psychological intervention. Researchers indicated psychological intervention is effective and has been found to effectively improve presenting symptoms of many mental illnesses, including PTSD (Foa, Keane, Friedman, & Cohen, 2010; NAMI).

In accordance with Adshead's (2000) statement that the incidence and prevalence of PTSD has continued to increase significantly since the first medical diagnosis, Foa et

al. stated it is imperative that the diverse clinician becomes familiar with all the possible psychological intervention options available in its treatment. As many researchers have explored PTSD and the strength of a variety of methodologies (Foa et al.; DeAngelis, 2008; Herlov, 2015; NAMI, Beck Institute, 2013) some methods have been reported to be more effective than others (Foa et al. It has been stated the difference in the approach effectiveness is dependent on the methodological rigor (Foa et al.). Rigor that included, but not limited to:

> Evidence based on randomized, well-controlled clinical trials for individuals with PTSD; Evidence based on well-designed clinical studies, without randomization or placebo comparison for people with PTSD; and, Evidence based on the recently developed treatment that has not been subjected to clinical or empirical tests in PTSD (p. 16).

Foa et al. also suggested that it is important for the clinician to follow certain guidelines before determining the best methodology to address the individuals PTSD symptomatology. The suggested guidelines for determining the best methodology to address an individual person's reported PTSD symptoms include, conducting a comprehensive diagnostic evaluation, forming and maintaining a therapeutic alliance, and reassurance of the patient's safety and welfare (Foa et al.). Additionally, according to Foa et al. it is also imperative for the clinician to provide education, monitor the individuals PTSD symptoms, their general function, and to identify any comorbid conditions. Lastly, it is imperative for the clinician to assess the client for treatment readiness and resistance (Foa et al.).

The steps relevant in improving PTSD symptoms through psychotherapeutic methods include, but are not limited to, repeating the imagery of the traumatic event, confronting the feared memory, reliving the traumatic experience in a supportive therapeutic setting, and focusing on the traumatic memory for long periods of time (Foa et al., 2010). Additionally, the "process of imaginal reliving helps to change the meaning of PTSD symptoms from being a sign of personal incompetence to one of mastery and courage" (Cahill, Rotbbaum, Resick, & Follette, 2010, p. 141). For the ability to evaluate the negative self-evaluation regarding the trauma allows the individual to change the evaluation and reduces the risk of fearful response to the trauma-related stimuli (Cahill et al., 2010).

The National Center for PTSD (PTSD: National Center for PTSD, 2015) reported cognitive behavioral therapy (CBT), eye movement desensitization and reprocessing (EMDR), medication, group therapy, brief psychodynamic psychotherapy, and family therapy are some of the best treatments available for PTSD, as well as prolonged exposure therapy (DeAngelis, 2008). Although there are a variety of evidenced-based methods, it is imperative that the clinician considers his or her comfort, background, and training in the methodology (DeAngelis, 2008).

Cognitive-behavioral therapy. Aaron T. Beck, the founder of CBT, is suggested to be the key figure in counseling and psychotherapy (Beck Institute, 2013). Based on the cognitive model, CBT is said to connect how the person's emotions are perceived, and focuses on exploring the relationship among personal thoughts and behaviors (Herlov, 2015; NAMI, 2016; Beck Institute, 2013). CBT is also suggested to be a modern evidence-based therapy, proven to be effective in many different mental disorders, and

encompasses some diverse techniques (Cahill, Paley, & Hardy, 2013; Robertson, 2010; Beck Institute, 2013).

Researchers Moonsammy et al. (2013) conducted a pilot study to examine the benefits of a combined intervention of exercise and CBT on 19 ovarian cancer patients (treatment group (*n* = 7); (surveillance group (*n* = 12 =). The authors suggested that the stimulation of the cognitive and cardiovascular response would improve the participant's mood, sleep, physical function and cancer-related fatigue (Moonsammy et al., 2013). According to the researchers, the participants reported symptoms that also met the criteria for PTSD (Moonsammy et al., 2013). The participant's baselines were initially assessed by self-report assessment questionnaires that collected information on the individual's demographic profile, physical activity, psychological functioning, anxiety, depression, self-efficacy, neuropathy, and fatigue (Moonsammy et al., 2013). The participants were also given a physical assessment (Moonsammy et al., 2013). Each participant's baseline was assessed again at weeks 12 and 24 (Moonsammy et al., 2013). Along with the 30 – 60 minute (3 – 5 times a week) aerobic and resistance training, the individuals participated in one-hour CBT sessions, every two weeks (Moonsammy et al., 2013).

A 26% dropout rate was reported and stated to be due to loss of follow-up and disease recurrence (Moonsammy et al., 2013). Seventy-five percent of the participants (n = 13) completed 9 or more of the CBT bi-weekly sessions (Moonsammy et al., 2013). According to Moonsammy et al. (2013) there were no significant differences indicated at baseline between the groups and the dropout rate did not affect the reported outcome. In conclusion, the authors indicated that the dual intervention of CBT and exercise reduced PTSD symptomatology, depression and anxiety trait and improved self-efficacy and

health-related quality of life amongst women diagnosed with epithelial ovarian cancer (Moonsammy et al., 2013).

In a randomized clinical trial, of 81 people who had undergone hematopoietic stem cell transplantation (HSCT) participated in a 6, 9, and 12-month baseline follow-up study (DuHamel et al., 2010). The participants were placed into either the CBT group (n = 47) or the assessment only group (n = 34). The CBT group received ten telephone CBT sessions with the intent to reduce PTSD symptoms, depression, and general anxiety, during a 10 to 16 week period (DuHamel et al., 2010). All session were approximately 60 minutes with the exception of the first session, which was recorded to be 90 minutes. According to DuHamel et al. (2010), 92% of the participants completed sessions 1 and 2, and 79% of the participants completed session 7 to 10 (mean SD = 3.27).

The authors reported of all the participants, 19% met the criteria for a PTSD three-symptom cluster diagnosis, 72% met a four-symptom clustered diagnosis, and 96% of all the participants met the diagnostic criteria for general distress with PTSD symptoms at the start of the study (DuHamel et al., 2010). The researchers indicated that the primary outcome in the treatment control group that participated in 10 CBT sessions were a decrease in PTSD symptoms, as well as intrusive thoughts about their illness and reported less avoidance. Utilizing the PTSD Checklist-Civilian Version, the Brief Symptom Inventory, the Clinical Administered PTSD Scale for DSM-IV, and the Sociodemographic and Medical Variable, the researchers reported that the participants who received CBT measured reported fewer intrusive thoughts and avoidance than those in the control group (DuHamel et al., 2010). Additionally, according to the DuHamel et al., (2010) the CBT group participants were also less likely to meet the PTSD diagnostic

criteria, for they reported significantly lower general distress. This study not only reinforces CBT as a beneficial psychological intervention in reducing distress in individuals diagnosed and undergoing medical treatment but also suggest an integrative approach might be useful.

In a review of the literature on psychological intervention in IVF patients, Doyle and Carballedo (2014) reported the results of a 12-month follow-up study conducted by Domar and associates where pregnancy rates were compared in women undergoing IVF treatment. The authors said that the women were randomly assigned to three groups, in which they received either CBT, attended a support group or assigned to a control group where neither variables were present (Doyle & Carballedo, 2014). According to Doyle and Carballedo (2014), the pregnancy rates of the CBT and support group (55%, 54%) were significantly higher than that of the control group (20%). The authors also stated that at the 6 and 12-month follow-up the CBT and support group individuals continued to indicate better mental health improvement than the control group (Doyle & Carballedo, 2014). However, the CBT group recorded the most significant increase (Doyle & Carballedo, 2014). Doyle and Carballedo's (2014) study also supports previous findings that suggested CBT is an effective psychological intervention to reduce psychological distress reported by individuals diagnosed and undergoing medical treatment. Additionally, the findings indicated that the reduction of the psychological stress could increase the infertile individuals chance for a positive pregnancy outcome (Doyle & Carballedo, 2014).

In summary, CBT is reported to be one of the most effective psychological intervention for many mental disorders, including PTSD. CBT explores the individual's

feelings and focuses on the individual's personal thoughts and behaviors, and researchers have investigated and reported that CBT decreases symptoms of distress, depression, and anxiety trait and reduces the individual's risk of PTSD. CBT has also been found to reduce the reported chronic distress found in infertile women who were undergoing infertility treatment and reported to increase pregnancy rates in the infertile woman.

Although CBT has been said to be the most utilized method to improve PTSD symptomatology, researchers also indicate exposure therapy to be just as effective. In comparison studies with the said methodologies, to date, no studies that I located show a significant improvement of PTSD utilizing any of the three therapeutic interventions discussed. Additionally, although Doyle and Carballedo (2014) discussed CBT and the reduction of psychological distress in infertile women undergoing advanced infertility treatment, I was unable to locate any studies that examined the relationship between infertility, PTSD, and CBT. Due to the correlations between the reported stress levels between the medical diagnosed infertile woman undergoing infertility treatment and the individual diagnosed with HIV, cancer and AIDS, and the gap in the literature, I think further research which this current study attempts to fill is warranted.

Eye movement desensitization and reprocessing and prolonged exposure therapy. EMDR is reported to be a psychotherapy treatment designed to alleviate the distress associated with traumatic memories (EMDR Institute, 2016). Shapiro (2002) suggested that the therapeutic goal of EMDR is not only to reduce anxiety, as many researchers have suggested, but also "includes the elicitation of positive affects, evoked insights, belief alternations, and behavioral shifts" (p. 1).

EMDR is bilateral stimulation that consists of 8, 90-minute sessions (Bae, Kim, & Park, 2008). During the session, the therapist evaluates the individual's traumatic memory through a process in which is called dual attention (Bae et al., 2008; Shapiro, 2002). Dual attention is the process of paying attention to the individual's image, cognition, emotion, and body sensations (Bae et al., 2008; Shapiro, 2002). The person is asked to recall the traumatic event while following the therapist's finger horizontally at the same time (Bae et al., 2008; Shapiro, 2002). This exercise is continued until the recall of the traumatic event no longer causes distress to the individual (Bae et al., 2008; Shapiro, 2002). Dependent on the therapist's he or she will integrate their preferred theoretical orientation and might include, psychodynamic, CBT, or experiential, to name a few (Shapiro, 2002).

In a systematic review of seven research studies, Seidler and Wagner (2006) compared the efficacy of EDMR and trauma-focused CBT in the treatment of PTSD. The authors restricted period for the articles used was from 1989 to December 2005, and the initial literature search results yielded 1100 articles (Seidler & Wagner, 2006). However, once the author's six inclusion criteria were defined only seven studies were included in the meta-analytic investigation (Seidler & Wagner, 2006). The authors indicated since both EMDR and CBT have already been found to be effective forms of psychotherapy interventions to treat PTSD, their aim was to examine if one method was more effective than the other (Seidler & Wagner, 2006). Authors concluded that the data obtained in their meta-analytic comparison suggested EMDR or CBT are equal and effective methods to treat PTSD (Seidler & Wagner, 2006). The authors also reported other researchers had found CBT to be more effective, however, Seidler and Wagner (2006)

suggested that the discrepancy might be due to the small sample size or the treatment conditions.

Like EMDR, PE involves in vivo exposure and imaginal exposure (Center for Deployment Psychology, 2013). Unlike EDMR, the repeated exposure to activities and memories of the traumatic event, takes place in a real environment in hopes to process the context and eliminate the perceived fear (Center for Deployment Psychology, 2013). Additionally, PE also assists the client in correcting the information that produces the fear and process the memory, thoughts and beliefs as well as retraining the individual to relax through breathing (Center for Deployment Psychology, 2013). As CBT and EMDR, PE is said to be another evidenced-based effective psychological intervention to treat individuals with PTSD as well as symptoms of depression, anger, and anxiety (Center for Deployment Psychology (2013).

In an aim to examine if early intervention prevents the development of PTSD, Rothbaum et al. (2012) provided three sessions of PE to137 post injury and depressed patients in an emergency room who met the DSM-IV criteria for PTSD. The patients were randomly assigned to either in the immediate intervention (n = 69) or assessment only (n = 68) groups. The patients were assessed three times, 72 hours post injury, four weeks post injury and 12 weeks post injury (Rothbaum et al. 2012). Overall, the findings indicated that the participants in the control group measured significantly decreased symptoms of posttraumatic stress, post-trauma, and depression throughout the assessment period indicating modified prolong exposure intervention successfully reduces PTSD and depression symptoms (Rothbaum et al. 2012).

EDMR and PE are both evidenced-based psychotherapeutic interventions designed to alleviate the distress associated with traumatic memories and reduce the risk and symptoms of PTSD. Both psychological interventions strive to assist the client with rewiring their thoughts, beliefs and reactive stimuli to the traumatic event; however, EDMR provides the safe therapeutic environment for repeating the traumatic event where PE takes the client to the outside world to repeat and relive the traumatic event. Although these studies are relevant to the current study, because they explore the reduction of PTSD symptomatology, they do not indicate current information on the positive or adverse effect on PTSD symptoms in women undergoing advanced fertility treatments or the infertile population. However, since research has found EDMR and PE to be effective in reducing PTSD in other medical diagnosed individuals, the examination is warranted to understand if EDMR and PE have been beneficial to medical diagnosed infertile women undergoing infertility treatment.

Infertility and Psychological Interventions

Many studies have explored the effectiveness of psychological intervention in the infertile population and repeatedly report psychosocial interventions reduce stress in women undergoing infertility treatment (Domar & Prince, 2011; Frederiksen et al., 2015; Kim et al., 2014). Litz et al. (2015) and Shubina (2015) said early psychological intervention effectively reduces symptoms of chronic PTSD, depression, and anxiety symptoms. There is also evidence that suggests psychological intervention during infertility treatment lessens the prolonged psychological impact of the traumatic experience (Jurado, Moreno-Rosset, Rio, & Espada, 2008).

Jurado et al. (2008) reported, therapy during treatment could help the patient become aware of their limits and resilience. Therefore, psychological intervention throughout the infertility protocol might help the patient get to know themselves and their partner better, by assisting the individual to accept the unacceptable of the infertility experience (Jurado et al., 2008). The authors also indicated that psychological intervention could assist the infertile patient to gain personal meaning to the infertile experience within their belief system (Jurado et al., 2008). Also, Jurado et al. (2008) and De Berardis et al. (2014) said therapy throughout the infertility protocol would decrease the prolong effect of the reported adverse traumatic experience. Since psychological intervention during treatment can help decrease the negative psychological symptoms, and to prevent anxiety, depression and phobias in the infertile individual (De Berardis et al., 2014).

Terzioglu (2001) examined 60 couples undergoing IVF treatment. The participants were randomly assigned to two studied groups (experimental ($n = 30$), control ($n = 30$). The experimental group received couples counseling and accessibility to support throughout their treatment, and the control group received no psychological intervention at all (Terzioglu, 2001). The authors reported significantly lower anxiety and depression scores in the experimental group ($p < 0.05$). The findings suggested that the psychological intervention coupled with IVF treatment not only reduced anxiety and depression but also increased pregnancy rates in the participants (Terzioglu, 2001).

Research regarding the long-term effect of the infertility experience is limited. Based on the significantly lower anxiety and depression scores recorded in a follow-up study, Ramezanzadeh et al. (2011) stated, psychiatric counseling should be mandated by

all fertility centers in order properly diagnose and treat infertility patients correctly. Griel Slauson-Blevins & McQuillan (2010) stated research that can answer questions about the long-term consequences of infertility is needed and suggested any effort to improve the infertility field of research has to be guided by a more holistic and sophisticated theoretical framework.

Psychological intervention throughout the infertility protocol is essential to the medical infertile individuals well-being. For it has been said the therapeutic process reduces the reported stress levels and decreases the long-term psychological impact of the traumatic event. Although research indicated that psychological intervention improves the medical diagnosed infertile woman's self-efficacy, I was unable to locate any studies that examined the long-term effect of the medical diagnosis and the infertility treatment. Therefore, although the literature indicated that a proper psychological diagnosis and treatment for the medical diagnosed infertile woman is essential, to date, no such diagnosis or treatment protocol has been established. Additionally, based on the above reviewed literature, the functional relationship between infertility, psychological interventions, and PTSD continues to go unanswered.

Based on Ramezanzadeh et al. (2011) call to mandate infertility counseling and the above literature account of how psychological intervention approves the infertile individuals mental well-being, examination of the functional relationship is crucial. Since the above literature suggests a proper diagnosis and treatment of PTSD in the medically diagnosed individuals is imperative, further investigation was warranted in the medical diagnosed infertile woman. Lastly, because the infertile woman's stress levels are critical throughout the infertility experience, and has been compared to those diagnosed with

HIV, AIDS, and cancer, exploration of the possible long-term effects was warranted. The current study sought out to provide recent findings and address the gap in the literature.

Summary and Conclusion

Historically, data suggest infertility has always been a major issue (Dubin, 1996) and Morshed-Behbahani et al. (2012) stated because the desire to have a child is reported to be one of a human beings motivation to continue life, infertility is a significant problem and the stigma associated with infertility is traumatic. Infertility is defined as the inability to conceive a child after one full year of having unprotected sex and is reported to be a common problem in women between the ages of 15 - 44 (Ali et al., 2013; World Health Organization, 2015). Although, a diagnosis of infertility can be traumatic, many women seek infertility treatment to achieve their craving for motherhood (Haelyon, 2010). Although, infertility treatments have been reported to increase the infertile woman's stress levels to mimic those with life-threatening diseases (Domar et al., 1993; Frederiksen et al., 2015).

Janoff-Bulman's theory provides details on how when a traumatic event violates the infertile individual's worldview, she no longer perceives the world as benevolent or predictable nor does she think of herself as competent or invulnerable (Park et al., 2012). Cobb (1976) social support and stress buffering theory provides answers to why the infertile women are vulnerable to PTSD because of her lack of positive social support (DeLong, 2012).

Burns and Covington (1999) defines the most commonly used and most effective method of infertility treatment as IVF. The chronic stress related to infertility treatment has also been reported to cause feelings of guilt, depression, isolation, low self-esteem,

irritable and avoidant behavior, and social isolation (Begum &Hasan, 2014; Kamel, 2010; Klock, 2011; Newton et al., 1999). Due to the increase psychological symptoms indicated to be associated with an infertility diagnosis and in-vitro fertilization treatment, the medically diagnosed infertile woman who undergoes infertility treatment might be at risk for Post Traumatic Stress Disorder (PSTD).

In a systematic review Daugirdaite et al. (2015) aimed to "integrate the research on posttraumatic stress (PTS) and posttraumatic stress disorder (PTSD) after pregnancy termination, miscarriage, prenatal death, stillbirth, neonatal death, and failed in vitro fertilization" (p.1). The authors concluded that PTSD does occur after nonmedical and medical termination of pregnancy, miscarriage, prenatal loss, and stillbirth (Daugirdaite et al., 2015). However, the authors could not examine the relationship between infertility and PTSD for systematic research evidence was nonexistent (Daugirdaite et al., 2015). Lastly, researchers indicated psychological intervention is effective and has been found to improve effectively presenting symptoms of many mental illnesses, including PTSD (NAMI, 2016).

Although researchers indicated the diagnosis of infertility changes the individual's self-image and causes extreme stress, I have found limited to no research that examines the prolong effect to the infertile individual (Klock, 2011; Women's Health Council, 2009). Ahuja (2009) stated psychological intervention throughout the infertile individuals fertility protocol will assist the infertile individual to cope with the psychological burden of infertility. Additionally, Ahuja (2009) reported the risk of clinical depression and the long-term psychological effects reported to be caused by infertility treatment can be prevented if psychological intervention was included in the fertility protocol. However,

to-date there are limited published studies that look at the long-term psychological effects of advanced infertility treatment on the infertile individual. Although researchers suggested the psychological impact of infertility treatment meets the diagnostic criteria for PTSD, I was unable to locate any studies that explored the infertility experience and PTSD.

Based on the presented articles in this literature review more exploration studies should be done. Additionally, it is important to understand the long-term effects and if the psychological impact is associated with the development of PTSD. Lastly, it is important to know if psychological intervention decreases the psychological effects and lessens the possibility of PTSD development. A more in-depth discussion of the methodology of this research will be addressed in Chapter 3.

Chapter 3: Research Method

Introduction

The principal purpose of this quantitative nonexperimental static-group comparison and correlational study was to determine the potential functional relationship between infertility and PTSD. Specifically, the relationship between fertility treatment and lack of psychological intervention in relation to PTSD symptoms in medically diagnosed infertile women in the United States were explored.

Chapter 3 contains four sections. The study's independent and dependent variables, research design, and research questions are identified and discussed in the first section. Section two contains explanations of the study's population, sample size and method, procedures for participant recruitment, instruments used to collect data, and data analysis plan. In the third section, I explain threats to internal and external validity and all ethical procedures, including, but not limited to, those related to the collection of data and confidentiality. The fourth and final section ends with a chapter summary and an introduction to Chapter 4.

Research Design and Rationale

Medically diagnosed infertile women's experiences were examined through Likert-type questionnaires. Belli (2008) stated that quantitative nonexperimental designs are beneficial when the researcher wants to study variables as they exist or when the variables qualify as constant characteristics, such as receiving an infertility diagnosis. In a quantitative study, a researcher uses numeric and quantifiable data to answer the hypothesis (Belli, 2008; Sousa, Driessnack, & Mendes, 2007).

Quantitative studies may lead to the use of exploratory research surveys, which are used most often when researchers are wanting to quantify relationships amongst variables through deductive reasoning and generalization, and that are non-experimental (Sousa et al., 2007). Creswell (2013) described survey questionnaires as allowing the researcher to collect the present views of a population at one given time and noted that they can be used to correlate variables. Survey questionnaires have been used to examine many issues concerning infertility, including, but not limited to, the psychosocial effect of infertility and attitudes toward infertility and its treatment, as well as the prevalence of PTSD (Chen, Shen, & Chen, 2012; Direkvand-Moghadam, Delpisheh, & Direkvand-Moghadam, 2014). In this study, survey questionnaires were used to examine the functional relationship between fertility treatment, psychological intervention, and PTSD and to identify the extent of the relationship between the trends, attitudes, and opinions of the studied population.

Methodology

Sampling

There are 67,017,000 women in the United States of reproductive age (13-44 years; Guttmacher Institute, 2015). The 13- to 23-year-old population was excluded from this study for reasons that included, but were not limited to, minor vulnerability, average reported age of women seeking infertility treatment, and age-appropriate guidelines for fertility treatment (APA, 2015; Frankfort-Nachmias & Nachmias, 2008; Monte & Ellis, 2014), so the eligible age range for this study's participants was 24-44 years. The average age of pregnant women who had live births was not considered, due to the inability to extract the number of live births that was due to third-party donor affiliation (e.g., ovum

donor, sperm donor, surrogacy, etc.). Additionally, based on population vulnerability, this study excluded individuals who were presently seeking fertility treatment and/or had undergone fertility treatment within the last 12 months, with intent to minimize harm (APA, 2015).

The Bedford Stem Cell Research Foundation has indicated that 85,000 women receive IVF treatment in the United States each year within the 483 available fertility clinics (Eggs & Society, 2011; Marketdata Enterprises, 2009). The CDC (2015) recognizes four infertility organizations in the United States, and the American Society for Reproductive Medicine's Mental Health Professional Group (ASRM/MHPG) lists three national adoption sites and four child-free-living U.S.-based organizations. Cafemom.com (2015) is a social networking site that reaches 3.1 million United States self-identified moms. I aimed to generate an accurate representative population by examining women between the ages of 24 and 44 years throughout the United States who had received a medical infertility diagnosis and infertile woman who had gone through infertility treatment and/or psychological intervention (successful or not).

Infertile participants in this study had to have completed their last fertility treatment at least 12 months and no longer than 3 years prior to the study. Anyone who sought advanced fertility treatment due to a genetic diagnosis was excluded from the study, for infertility due to a genetic diagnosis might imply previous knowledge of the need for reproductive assistance before an infertility diagnosis. Lastly, all participants were required to understand and read English well enough to participate independently.

Power Analysis for Target Sample Size

The analysis plan included a 2x3 factorial ANOVA and a linear regression with nine predictors. Interaction effects in ANOVA are typically smaller than main effects. To detect an interaction effect between small and medium size (i.e., semipartial *r*2 =. 035) in an overall ANOVA that accounts for 13% of the variance in PTSD symptomology (a medium-sized overall effect), a sample size of 198 is needed with alpha = .05 and power = .80. For the linear regression with the same alpha and power parameters, nine predictors, and detection of a small to medium semipartial squared effect of .035 in an overall model that accounts for 19% of PTSD symptomology scores (a medium to large overall effect); a sample of 184 is required. Based on these calculations, the target sample size was about 200 participants.

Procedure

In order to obtain infertile participants, I placed an advertisement for participation on approved website blogs after receiving permission from the Institutional Review Board (IRB) of Walden University and participation social media website page owners. A list of additional websites was obtained from CDC and Cafemom.com affiliates, and an invitation advertisement was distributed on targeted organizations' and social media websites displaying a brief description of the study, the study's eligibility criteria, as well as a link to the study's online questionnaire hosted by Qualtrics. Permission to use the Fertility Problem Inventory (FPI) was granted; a letter of permission is included in Appendix F. The PTSD Checklist for DSM-5 (PCL-5) and the Fertility Quality of Life (FertiQoL) instrument are available and accessible online to use for research without author permission; a statement granting public permission for use is also in Appendix D.

The participants were informed that the study was completely voluntary, and a full explanation of the study's anonymity was provided. The disclosure detailed the investigator's inability to collect any identifying information that might be available on the participant's computer, including her name or other identifying information connected to any of the participant's responses. Qualtrics is secure with SSL encryption and allows for disabling IP address tracking. Once an individual acknowledged informed consent on the first page of the questionnaire, she was directed to an eligibility-screening page; if deemed eligible for the study, she was directed to pages to complete the FPI, the PCL-5, and the FertiQoL. Whenever a participant entered the site, Qualtrics recorded the respondent's sign-on with a time stamp.

The participants were given unlimited time to complete the survey. At the end of the survey, the participants were given the option to withdraw from the survey. If an individual chose to complete the survey, she was automatically thanked for her participation. The surveys and consent form are located in Appendix A, C, E, G and I.

Instrumentation and Operationalization of Constructs

Demographic Items

In addition to the FPI, the PCL-5, and the FertiQoL, participants were asked to complete a demographic questionnaire developed for the study (Appendix A). I used the demographic questionnaire to gain information on the participant's gender, age, ethnicity, race, culture, marital status, total annual income, highest level of education completed, religious preference, last infertility treatment, type of fertility treatment, number of live births, if the participant adopted,number of living children, as well as to seek participants' disclosure of any psychological treatment received during infertility treatment.

PCL-5

The PCL-5 is a 20-item self-report measure that takes approximately 5-10 minutes to complete and assesses the 20 DSM-5 symptoms of PTSD (Weathers et al., 2014, Weathers, Kane, & Foa, 2010). Survey questions consist of possible symptoms such as (a) "feeling very upset when something reminded you of the stressful experience"; (b) "having strong negative beliefs about yourself, other people, or the world"; and (c) "feeling distant or cut off from other people" (Weathers et al., 2014). The symptoms are rated from 0-4, with numbers on this scale corresponding to *not at all*, *a little bit*, *moderately*, *quite a bit*, and *extremely* (Weathers et al., 2014). According to the publishers, the affiliated staff members of the National Center for PTSD, the PCL-5 is scored in several ways (Weathers et al., 2014). The total score from each of the 20 items was used to obtain a composite mean symptom severity score that was interpretable on the 0-4 scale (Weathers et al., 2014). I obtained total symptom severity (0-80) by summing the scores of each of the 20 items (Weathers et al., 2014). Based on the PCL-5 cut-point 33, I made preliminary validation of the scores (Weathers et al., 2014).

The first study to demonstrate the "temporal stability of the PCL-5" was a study involving 507 combat-exposed veterans of Iraq and Afghanistan (Keane et al., 2014). The authors found that the "DSM-5 model provided an adequate fit to the data baseline," and Dickstein et al. (2014) confirmed the results (Keane et al., p. 1138). Bondjers, Sveen, and Willebrand (2015) also used the PCL-5 to evaluate PTSD in parents of burn victims hoping to establish a reliable and viable screening tool for the intended population. The researchers indicated that the Cronbach's alpha values (O.56 and 0.77) of the participating parents ($N = 62$) were acceptable and proved that the PCL-5 has high

consistency and concurrent validity. Bondjers et al. not only concluded that the PCL-5 proved to be a psychometrically sound instrument, but also stated that the four PCL-5 subscales (Intrusion, Avoidance, Negative Alterations in Cognition and Mood, and Arousal and Reactivity) also proved that the instrument is a viable measure for traumatic and perceived stress (Bondjers et al., 2015).

FertiQoL

The FertiQoL was developed by Boivin, Takefman, and Braverman (2011) with sponsorship from the European Society of Human Reproduction and Embryology, the American Society for Reproductive Medicine, and Merck Serono, an affiliate of Merck KGaA, Darmstadt, Germany. The FertiQoL, the first internationally validated self-report questionnaire to assess quality of life in infertile individuals, takes approximately 10 to 15 minutes to complete and consists of 36 items, 34 of which yield six subscales that can be collapsed into two second-order scales or a single overall scale (Boivin et al., 2011). Two subscales (10 of the 34 items) are optional because they apply only to individuals who underwent fertility treatment.

The four subscales, the FertiQol item numbers that make up each subscale, and Cronbach's alpha are shown in Table 1. All four subscales are composed of six items, and all have adequate internal consistency as indexed by Cronbach's alpha.

The emotional subscale measures the impact of negative emotions on quality of life. An example item is "Do your fertility problems cause feelings of jealousy and resentment?" The mind-body subscale measures the impact of fertility problems on physical health, cognitions, and behavior; an example item is "Do you feel drained or worn out because of fertility problems?" The relational subscale measures partner-related

issues, such as “Are you satisfied with your sexual relationship even though you have fertility problems?” The social subscale focuses on issues with family, friends, and general social life, such as “Are you socially isolated because of fertility problems?”

Table 1

FertiQol Subscales

Subscale	Items	Cronbach’s α
Emotional	4R, 7, 8, 9, 16, 23	.90
Mind-body	1, 2, 3, 12, 18, 24	.84
Relational	6, 11R, 15R, 19, 20, 21R	.80
Social	5, 10, 13, 14R, 17, 22	.75

Note. Items with an *R* require reverse coding.

The FertiQol items use a 5-point Likert-type scale, but the scale labels differ depending upon the type of question. Questions that ask for an evaluative response use the following scale: 0 (*very poor*), 1 (*poor*), 2 (*neither good nor poor*), 3 (*good*), and 4 (*very good*). Satisfaction-related questions use the following scale: 0 (*very dissatisfied*), 1 (*dissatisfied*), 2 (*neither satisfied nor dissatisfied*), 3 (*satisfied*), and 4 (*very satisfied*). Questions related to frequency use the following scale: 0 (*always*), 1 (*very often*), 2 (*quite often*), 3 (*seldom*), and 4 (*never*). Questions concerning intensity use the following scale: 0 (*an extreme amount*), 1 (*very much*), 2 (*a moderate amount*), 3 (*a little*), and 4 (*not at all*). Finally, questions related to capacity use the following scale: 0 (*completely*), 1 (*a great deal*), 2 (*moderately*), 3 (*not much*), and 4 (*not at all*). All four subscales were computed as mean composites for analysis purposes.

In addition to the items that make up scale scores, there is an item that asks participants to rate their health and an item that asks them to rate their quality of life. These items may be used as fidelity checks with respect to subscale scores.

FPI

The FPI, developed by Newton et al. (1999), is a 46-item scale measuring level of psychological strain on social, sexual, relationship, need for parenthood, and rejection of child-free living and takes approximately 10-15 minutes to complete (Moura-Ramos et al., 2011). Examples of survey questions are (a) "Pregnancy and childbirth are the two most important events in a couple's relationship," (b) "The holidays are especially difficult for me," and (c) "I feel empty because of my infertility problems, and I can't help comparing myself with friends who have children" (Newton et al., 1999). There are five subscales, and the FPI female norms were reported as follows: Social concern, 10 items, (M = 27.6, SD = 11.0); Sexual concerns, eight items, (M = 18.4, SD = 7); Relationship concerns, 10 items, (M = 21.6, SD = 9.3), Rejection of child-free lifestyle, 8 items, (M = 27.3, SD = 8.2); Need for parenthood, 10 items, (M = 39.2, SD = 9.8); and Global stress, 46 items, (M = 134.4, SD = 33.8; Newton et al., 1999). All items are scored from 1 (*strongly disagree*) to 6 (*strongly agree*) on a response scale, and for the purposes of this study, mean composite scores for each subscale was calculated and used in analyses. According to Newton et al., all of the subscales present good reliability, with Cronbach's α coefficients ranging from 0.77 to 0.87. In developing reliability and validity of the FPI, Newton et al., reported that a high score on the FPI suggests that the infertile individual's stress level is higher than the average for the infertile population in treatment.

Summary of Measures and Permission for Use

The PCL-5 and The FertiQoL are available and accessible, are online, and may be used freely for research. Written permission to use the FPI was obtained. Permissions to use all instruments are included (see Appendix B, D and F).

The PCL-5 and the psychological fertility-related questionnaires were relevant to the examination of the stated population because they assessed whether an infertility diagnosis and infertility treatments caused PTSD symptoms in the medically diagnosed infertile women because of the violation of the individuals' worldview by measuring the individuals' self-reported symptoms and cluster severity. The PCL-5 defined provisional PTSD symptomatology, established whether a traumatic event occurred, determined the worst event, and indicated whether there was more than one traumatic event (Weathers et al., 2014). The psychological fertility-related questionnaires are reliable to measure the impact of fertility problems and their treatment, as well as if and how an infertility diagnosis, fertility treatment, and psychological intervention have affected an infertile individual and the possible long-term consequences of these experiences (Boivin, 2009; Boivin et al., 2011).

Data Analysis Plan

Descriptive Statistics

Descriptive statistics were used to quantify and graphically present data collected from the four questionnaires regarding the medically diagnosed infertile women's experiences related to fertility treatment, psychological intervention, and PTSD. Descriptive statistics include standard deviation, mean, and percentages.

Inferential Statistics to Test Hypotheses and Answer Research Questions

I utilized a 2 (IVF treatment) X 3 (psychological intervention) factorial ANOVA study to examine and compare the functional relationship between variables, and a multiple linear regression to understand the PTSD symptomology scores as accounted for by the four FertiQol subscale and the five FPI subscale scores (Campbell & Stanley, 1963; Frankfort-Nachmias & Nachmias, 2008). I set out to answer the question: Does advanced infertility treatment and psychological intervention affect PTSD symptoms in the medically diagnosed infertile woman?

1. What is the extent of difference in PTSD symptoms between medically diagnosed infertile women who (a) do and do not undergo advanced infertility treatment, (b) do and do not undergo psychological intervention, and (c) the interaction of advanced infertility treatment and psychological intervention? The following hypotheses assume controlling for the other factor and interaction effect.

$H_0$1: There is no significant difference in PTSD symptoms between medically diagnosed infertile women who undergo advanced infertility treatment and medically diagnosed infertile women who do not undergo advanced infertility treatment.

$H_1$1: There is significant difference in PTSD symptoms between medically diagnosed infertile women who undergo advanced infertility treatment and women who do not undergo advanced infertility treatment?

$H_0$2: There is no significant difference in PTSD symptoms between medically diagnosed infertile women who receive psychological intervention and medically diagnosed women who do not receive psychological intervention.

$H_1$2: There is a significant difference in PTSD symptoms between medically diagnosed infertile women who receive psychological intervention and medically diagnosed women who do not receive psychological intervention.

$H_0$3: There is no advanced infertility treatment and psychological intervention interaction effect on PTSD symptoms.

$H_1$3: There is an advanced infertility treatment and psychological intervention interaction effect on PTSD symptoms.

2. What is the overall and relative effect of the four FertiQol subscale scores and five FPI subscale scores in accounting for variance in PTSD symptomology scores?

This examination followed a model-building approach (Jaccard & Jacoby, 2010), rather than the specification and testing of specific hypotheses, for the purpose of describing the most effective model of variables that explain PTSD symptomology (Cohen et al., 2003; Jaccard & Jacoby; Tabachnick & Fidell, 2007), and comparing the relative contribution of each variable in the model (Cohen et al., 2003; Jaccard & Jacoby; Tabachnick & Fidell) in order to rank order potential targets of intervention to reduce PTSD symptomology.

Threats to Validity

As in any study, there are possible external and internal threats to the study's validity; however, I think an examination in its entirety, including generalizations and

inferences, and developing a strategic plan to address each possibility before the experiment was imperative (Frankfort-Nachmias & Nachmias, 2008). For instance, although efforts were made to gain a representation of participants throughout the United States, I was not confident that the results would not be specific to a certain area. Additionally, I was not sure that other outside elements would not influence the participants PTSD symptoms. I addressed this area of concern by using questionnaires that specifically looked to determine the exact traumatic event.

The length of the study might also have threaten the internal validity to the study, for according to research the longer the study takes, the more chance an unpredictable event might take place or the participant might decide not to complete the survey (Lund Research, 2012). Utilizing a multiple-choice survey could also be ab additional threat to internal validity, for I could not be sure the participants would mark every question as intended (Lund Research, 2012).

Ethical Procedure

Each potential participant was educated on the intended study and what their participation entailed. This was to ensure that the potential participants freely reach, without coercion, a true informed decision about study participation. A copy of the informed consent was provided to the potential participants and the only information that this researcher did not disclose was information that might influence or lead the participant to respond untruthful.

The consent form included the purpose of the research, the procedures to be followed, any risk and or discomforts, any benefits associated with participation including possible therapy condition participation, and confidentiality of information,

including maintaining the collected data for 7 years. Furthermore, the consent form also informed the participants of the right to discontinue participation in the study at any time even after providing consent. The participants were also given a contact number in case they had questions. The study results are not individually reported. The collected data is secured in a password-protected file, on a password-protected jump-drive that is stored on a computer's hard drive, where it will be kept for 7 years.

Summary

The purpose of this chapter was to present the research design and methodology of the study. The chapter was broken up into four sections and the studies independent and dependent variables; research design and research questions were identified and discussed in the first section. The second section explained the studies population, sample size and method, participation recruitment, and what instruments was used to collect the data and the data analysis plan. The third section explained the threats to internal and external validity and all ethical procedures, including, but not limited to the collection of data and confidentiality. The fourth and last section ended with the chapter's summary and the introduction of Chapter 4. The impact of the independent variables on the dependent variable and the statistical analysis will be reported in Chapter 4.

Chapter 4: Data Analysis

Introduction

The purpose of this study was to better understand the potential functional relationship between infertility treatment, psychological intervention, and PTSD in medically diagnosed infertile women in the United States. The surveys used in this quantitative study were designed to measure the 20 DSM-5 symptoms of PTSD, the quality of life of the infertile individual, and the level of infertility- related stress (i.e., sexual, social, relationship, rejection of child-free lifestyle, and need for parenthood). The data were analyzed using a 2 X 3 factorial ANOVA and a multiple linear regression, and all statistical analyses were performed using SPSS.

In Chapter 4, I present and describe the methods used to analyze the data and the preliminary and main analyses. The summary of results is reported in the final section of this chapter, including the frequencies for all categorical variables and results of the ANOVA and multiple linear regression.

Data Collection

Data were collected from June 22, 2016, through July 6, 2016, during which 238 individuals accessed the online survey. Of the 238 surveyed individuals, 196 were eligible to participate, indicating that they were female and had received a medical infertility diagnosis. Of these, nine were eliminated from analysis due to substantial missing data ($n = 4$) and identified multivariate outliers ($n = 5$), leaving a final valid sample of 187.

Participants for the study were invited through a posted invitation, which provided a link to the online survey, on several reproductive organization and social media sites.

Interested participants followed the link to the study's online questionnaire, where the nature and purpose of the study, the data collection procedure, potential risks and benefits, and confidentiality were explained. Additionally, the participants were informed that their participation was anonymous and voluntary, and that they could terminate their participation at any time. If the participant met the infertile medical diagnosis criteria, the survey was displayed, and the individual was allowed to participate in the study. If the participant marked that she had not received a medical infertility diagnosis, the questionnaire was immediately terminated. The questionnaire was also terminated if the individual marked *male*. If the participant marked that she had not received any type of fertility treatment, the *Optional Treatment Module* was blocked, and the participant was rerouted to the last survey.

Participant Demographics

Each participant completed a self-report demographic questionnaire. The majority of the 100% female participants were 24- to 34-year-old White, Christian, married college graduates with a household income between $100,000 and $149,000. Tables 2 and 3 present these demographic data.

Table 2

Frequency Distribution for Gender, Age, Race/Ethnicity, Marital Status, and Religious Preferences for Medically Diagnosed Infertile Women

Variable	*N*	%
Gender		
Female	187	100
Age		
24-34 years old	106	56.7
35-44 years old	81	43.3
Race/Ethnicity		
White	155	82.9
Black or African American	6	3.2
Hispanic, Latino, or Spanish	8	4.3
Asian Indian	1	.5
Chinese	2	1.1
Filipino	3	1.6
Japanese	2	1.1
Korean	2	1.1
Multiple	8	4.3
Marital status		
Married	170	90.9
Single	7	3.7
Divorced	3	1.6
Separated	1	.5
Never married	2	1.1
Other (Specify)	4	2.1
Marital/Other		
Engaged	1	.5
Living with long-term partner	1	.5
Living with someone	1	.5
Religious preference		
Christian	102	54.5
Seventh-Day Adventist	2	1.1
Protestant	19	10.2
Jewish	8	4.3
Orthodox Church	3	1.6
Mormon	3	1.6
Roman Catholic	30	16.0
Something else (please specify)	20	10.7
Atheist	7	3.8
Agnostic	2	1.1
Buddhist	1	.5
No affiliation	7	3.7
Spiritualist	1	.5
Wiccan	1	.5

Table 3

Frequency Distribution for Education and Income for Medically Diagnosed Infertile Women

Variable	*N*	%
Education level		
Some high school	1	0.5
High school graduate	14	7.5
Some college	15	8.0
Trade/technical/vocational training	10	5.3
College graduate	104	55.6
Some postgraduate work	8	4.3
Postgraduate degree	34	18.2
Other (please specify)	1	0.5
Education/Other:		
Two master's	1	0.5
Income		
Less than $10,999	2	1.1
$10,000 to $19,999	4	2.1
$20,000 to $29,999	7	3.7
$30,000 to $39,999	9	4.8
$40,000 to $49,999	9	4.8
$50,000 to $59,999	17	9.1
$60,000 to $69,999	8	4.3
$70,000 to $79,999	9	4.8
$80,000 to $89,999	8	4.3
$90,000 to $99,999	23	12.3
$100,000 to $149,999	67	35.8
$150,000 or more	24	12.8

The demographic survey required the participant to indicate whether she had undergone any type of fertility treatment and, if so, what type of treatment(s). This included any medical consultation or intervention, and the participant was allowed to mark all that applied as well as specify *other*. Table 4 presents this treatment distribution, and Table 5 presents the last received fertility treatment reported by the 187 valid participants.

Table 4

Frequency Distribution for Type of Infertility Treatment

Treatment	Analysis code	
	No advance Tx group	Advance Tx group
One type		
IUI	35	
IVF		37
GIFT/ZIFT		3
None	44	
Other	10	
Two types		
IUI + IVF		16
IUI + GIFT/ZIFT		5
IVF + GIFT/ZIFT		3
IUI + Other	3	
Three types		
IUI + IVF + GIFT/ZIFT		31
Total	92	95

The results revealed that 95 (50.8%) of the women had received some type of advance fertility treatment (IVF, GIFT, or ZIFT), 38 (18.7%) had received IUI, and 10 (5.3%) indicated “other” (including clomid, consultation, ultrasounds, herbs, fertility drugs, and unspecified medications).

Table 5

Frequency Distribution for Last Received Fertility Treatment

Variable	*N*	%
12 months ago	80	42.8
24 months ago	44	23.5
36 months ago	17	9.1
Does not apply	27	14.1

Although 45.5% (*n* = 86) of the participants reported that they had given birth, 50.3% (*n* = 94) indicated that they had experienced one or more miscarriages, and 16.6% (*n* = 31) reported that they had never given birth. However, 12.8% (*n* = 24) of the participants reported that they had adopted. The participants were also required to indicate whether they had received any psychological intervention after they had received an infertility diagnosis; 38% (*n* = 71) indicated that they had not, 37.4% (*n* = 70) indicated that they had received psychological intervention at least once, and 24.6% (*n* = 46) indicated that they had received psychological intervention throughout their treatment. Of the total number of participants, 37.4% (*n* = 70) indicated that their infertility treatment had resulted in a chemical pregnancy.

Research Questions and Hypothesis Testing

Two research questions addressed the conceivable impacts of infertility and psychological treatment on PTSD symptoms in medically diagnosed infertile women who had undergone IVF treatment. The first question compared medically diagnosed infertile women who had received and had not received advanced infertility treatment as well as

medically infertile women who had received and had not received psychological treatment, with the aim of determining the possible interaction between psychological intervention and advanced infertility treatment. Question 2 was aimed toward understanding the possible contributing factors to PTSD symptomatology in the medically infertile woman.

Research Question 1: What is the extent of difference in PTSD symptoms between medically diagnosed infertile women who (a) do and do not undergo advanced infertility treatment, (b) do and do not undergo psychological intervention, and (c) the interaction of infertility treatment and psychological intervention?

The following hypotheses assume controlling for the other factor and interaction effect.

$H_0 1$: There is no significant difference in PTSD symptoms between medically diagnosed infertile women who undergo advanced infertility treatment and medically diagnosed infertile women who do not undergo advanced infertility treatment.

$H_1 1$: There is a significant difference in PTSD symptoms between medically diagnosed infertile women who undergo advanced infertility treatment and medically diagnosed infertile women who do not undergo advanced infertility treatment.

$H_0 2$: There is no significant difference in PTSD symptoms between medically diagnosed infertile women who receive psychological intervention and medically diagnosed infertile women who do not receive psychological intervention.

$H_1 2$: There is a significant difference in PTSD symptoms between medically diagnosed infertile women who receive psychological intervention and medically diagnosed infertile women who do not receive psychological intervention.

$H_0$3: There is no advanced infertility treatment and psychological intervention interaction effect on PTSD symptoms.

$H_1$3: There is an advanced infertility treatment and psychological intervention interaction effect on PTSD symptoms.

A 2 x 3 factorial ANOVA was conducted to examine the influence of two independent variables (infertility treatment and psychological intervention) on PTSD symptomatology. Medically diagnosed infertile women included six levels: (1) infertile women who received advance fertility treatment and (1a) no psychological treatment, (1b) one-time psychological treatment, and (1c) psychological treatment throughout their infertility treatment; and (2) women who received no advanced medical treatment and (2a) no psychological treatment, (2b) one-time psychological treatment, and (2c) psychological treatment throughout. Levene's test of equality of error variance was significant, $F(5, 181) = 3.92$, $p = .002$, but the ratio of largest to smallest cell variance (2.06/0.76) was 2.71, below the critical value of 3.0, so homogeneity was sufficient to have confidence in the results (Tabachnick & Fidell, 2007).

In factorial ANOVA, the estimated marginal means (EMM) of main effects are tested, controlling for other factors in the model. The advanced infertility treatment group ($EMM = 2.38$, $SE = .117$) had slightly higher PTSD scores than the group without advanced infertility treatment ($EMM = 2.19$, $SE = .147$), but the effect was not statistically significant, $F(1, 181) = 1.04$, $p = .310$. The main effect for psychological treatment was significant, $F(2, 181) = 13.26$, $p < .001$, partial $\eta^2 = .128$. Those who received no psychological treatment ($EMM = 1.65$, $SE = .143$) had significantly lower

PTSD scores than those who received psychological treatment once (*EMM* = 2.55, *SE* = .131) or throughout their infertility treatment (*EMM* = 2.65, *SE* = .204).

The infertility treatment by psychological treatment interaction was also significant, $F(2, 181) = 3.98$, $p =. 02$, partial $\eta^2 = .042$. Because the interaction was significant, simple main effects were analyzed. As illustrated in Figure 1, infertility treatment had a significant effect on PTSD symptomatology only for those participants who received no psychological treatment; $F(1, 181) = 8.395$, $p = .004$, partial $\eta^2 = .044$. PTSD symptomatology for the subgroup who received advanced infertility treatment and no psychological treatment (*EMM* = 2.07, *SE* = .240) was higher than for those receiving no advanced infertility treatment and no psychological treatment (*EMM* = 1.24, *SE* = .155).

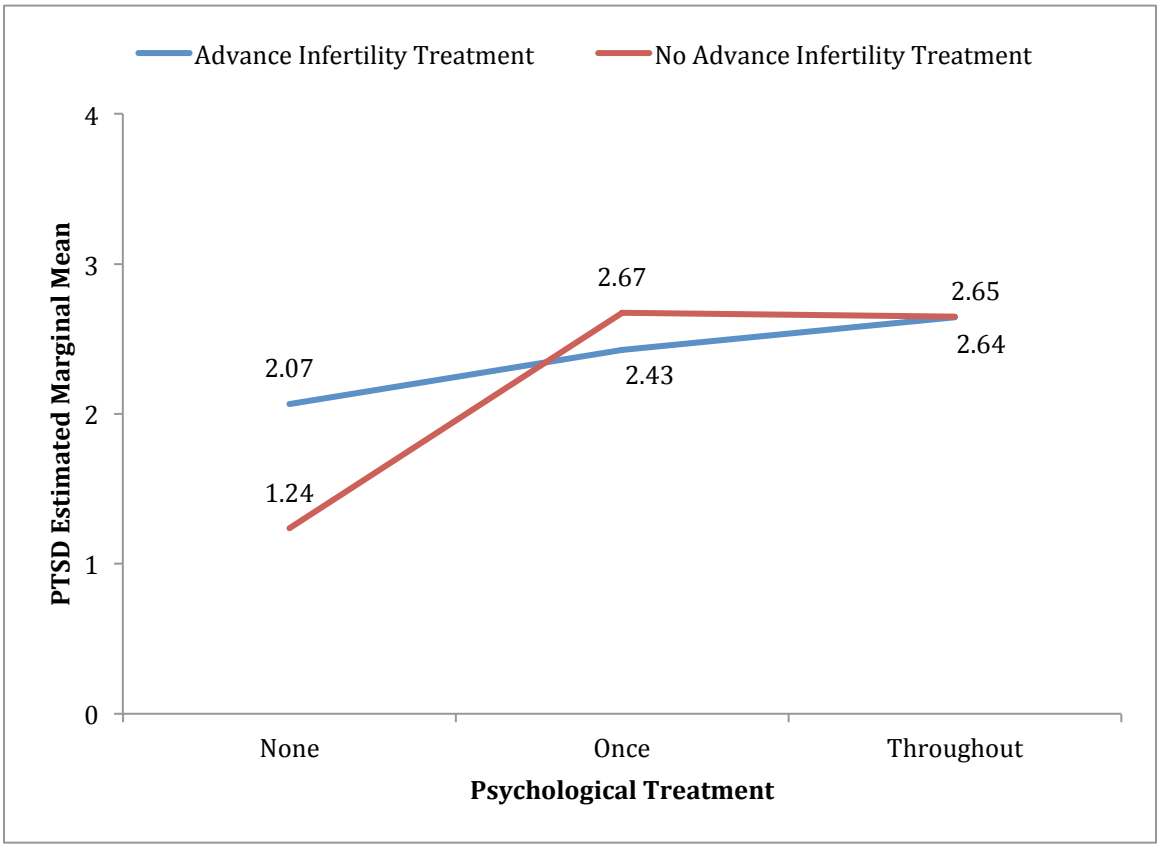

Figure 1. Estimated marginal means of infertility treatment by psychological treatment.

Research Question 2: What is the overall and relative effect of the four FertiQol subscale scores and five FPI subscale scores in accounting for variance in PTSD symptomology scores?

A multiple linear regression and correlation was conducted to predict PTSD symptomatology with three FertiQol subscales (emotional, mind and body, social) and the five FPI subscale scores (social concern, sexual concern, relationship concern, rejection of child-free lifestyle, and need for parenthood). As seen in Table 6, the PCL-5 scale (20 item) and the FPI scale (41 item) are acceptable measures of reliability (Cornbachem) and correlation was conducted to predict the FertiQol emotional subscale (5 item), FertiQol mind and body subscale (6 item), and FertiQol social subscale (4 item)

also had acceptable internal consistency (Cronbachhad acceptable internal consistency (CFertiQol mind and body subscale (6 item), and FertiQol social subscale (4 item) emotional, mind and body, social) and eight of the 15 pairwise correlations across the six items were negative, violating summative scaling. The results also showed that skewness ranged between -0.4 and -1.1. The values of kurtosis ranged between -0.5 and 1.0. Considering skewness and kurtosis together, the results indicated that both are in acceptable range for normality.

Table 6

Descriptive Analysis and Pairwise Comparisons Among the Scales

Scale	Items	α	*M*	*SD*	Min	Max	S	K
PCL	20	.98	2.16	1.23	0.00	4.00	-0.4	-1.2
QOL emotional	5	.93	1.67	1.08	0.00	4.00	0.5	-0.7
QOL mind-body	6	.94	1.98	1.18	0.00	4.00	0.2	-1.2
QOL social	4	.89	1.89	1.17	0.00	4.00	0.4	-1.1
FPI social	10	.85	3.52	1.01	1.00	5.70	-0.5	0.6
FPI sexual	6	.93	3.87	1.44	1.00	6.00	-0.5	-0.8
FPI relationship	8	.87	3.44	1.18	1.00	6.00	-0.6	-0.5
FPI rejection	8	.91	4.20	1.18	1.13	6.00	-0.6	-0.5
FPI need	9	.90	4.41	1.09	1.00	6.00	-1.1	1.0

Table 7 summarizes the regression coefficients and the correlations between predictor variables are presented in Table 8. The R^2 for the overall model was 70.3% with an adjusted 69.0%, showing a large effect size. The overall regression equation was significant, $F(8, 178) = 52.669$, $p < .001$, $R^2 = .703$ (a very large overall effect). The four predictor variables, FertiQol mind and body, FertiQol social concern, FPI social, and FPI relationship concern were statistically significant predictors ($p < .05$). However increase PTSD symptomatology were only indicated in the FPI relationship scores. The

FertiQol mind and body, FertiQol social, FPI social concern, and FPI relationship concern indicated decreased PTSD symptomatology. Predictor importance, based on rank order of the absolute value of semipartial correlations, was: (a) FertiQol mind and body, uniquely accounting for 3.1% of PTSD variance; (b) FPI social, uniquely accounting for 2.0% of PTSD variance; (c) FPI relationship and FertiQol social concern, each uniquely accounting for 1.1% of PTSD variance. The participants FPI need for parenthood, FPI emotional, FPI sexual concern, and rejection of childfree lifestyle was non-significant.

Table 7

Predicting PTSD Symptomatology

Variable	*B*	95% CI	β	*sr*	*p*
Constant	3.585	2.381, 4.788			.000
QOL emotional	-.080	-.288, .128	-.070	-.031	.449
QOL mind-body	-.454	-.664, -.245	-.434	-.175	.000
QOL social	-.253	-.450, -.055	-.240	-.103	.012
FPI social	-.296	-.464, -.127	-.241	-.141	.001
FPI sexual	.101	-.078, .280	.118	.046	.266
FPI relationship	.211	.049, .373	.201	.105	.011
FPI rejection	-.039	-.145, .067	-.037	-.029	.473
FPI need	.040	-.117, .198	.036	.021	.612

Note. CI = confidence interval for *B*; *sr* = semipartial correlation (aka, part correlation).

Table 8 shows a significant correlation between FPI sexual concern and FPI rejection concern. However, FPI sexual concern was not significantly related to FPI relationship concern.

Table 8

Intercorrelations of Criterion and Predictors (N = 187)

	Variables	1	2	3	4	5	6	7	8	9
1.	PCL	1								
2.	QOL emotional	-.718	1							
3.	QOL mind-body	-.802	.841	1						
4.	QOL social	-.758	.826	.873	1					
5.	FPI social	.431	-.667	-.556	-.635	1				
6.	FPI sexual	.706	-.741	-.767	-.736	.660	1			
7.	FPI relationship	.654	-.680	-.647	-.670	.631	.841	1		
8.	FPI rejection	.270	-.140*	-.289	-.250	-.164*	.284	.176**	1	
9.	FPI need	.604	-.731	-.667	-.628	.587	.766	.650	$.085^{ns}$	1

Note. All pairwise correlations significant at $p < .001$ one-tailed except as indicated below.
** $p < .01$; * $p < .05$; ^{ns} $p > .05$.

Summary of Results

The purpose of this study was to better understand the potential functional relationship between infertility treatment, psychological intervention, and PTSD in medically diagnosed infertile women in the United States. A 2 x 3 factorial ANOVA was performed to examine the influence of two independent variables (infertility treatment and psychological intervention) on PTSD symptomatology. Additionally a multiple linear regression was conducted to predict PTSD symptomatology with three FertiQol sub scales (emotional, mind and body, social) and five FPI subscale scores (social concern, sexual concern, relationship concern, rejection of childfree lifestyle, and need for a

parenthood). The results revealed in the factorial ANOVA, although the main effect for infertility treatment was not significant, the main effect for psychological treatment was significant. In addition, the infertility treatment by psychological treatment interaction was also significant, allowing the simple main effect to be analyzed. The simple main effects for psychological treatment were significant only for those who did not receive infertility treatment. Also, the overall regression equation was statistically significant and indicated that the four variables, FertiQol mind and body, FertiQol social concern, FPI social and FPI relationship concern, predicted participants' PTSD symptomatology.

Chapter 5 summarizes the study and presents conclusions about the findings. In addition, Chapter 5 will address the social change implications of these findings, the limitations of the study, and recommendations for continued research in this area.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to better understand the potential functional relationship between infertility treatment, psychological intervention, and PTSD in medically diagnosed infertile women in the United States. The surveys used in this quantitative study were designed to measure the 20 DSM-5 symptoms of PTSD, the quality of life of the infertile individual, and the level of psychological strain on social, sexual, relationship, the need for parenthood, and rejection of child-free living. The data were analyzed using a 2 X 3 factorial ANOVA and a multiple linear regression. All statistical analyses were performed using SPSS.

Participants were 187 diagnosed infertile women who volunteered to participate in the current study. The surveys containing the informed consent and survey instruments were made accessible on Qualtrics, a secured website, with the intent to ensure confidentiality. The participants were all female, and the majority of the participants were 24- to 34-year-old White, Christian, married college graduates with household income between $100,000 and $149,000. Previous studies have focused extensively on infertility variables such as stress, anxiety, depression, psychological impact, and relational problems in both male and female infertile individuals (Lukse &Vacc, 1999; Smeenk et al., 200; Verhaak et al., 2007). However, the current study is the first to examine the interaction between infertility treatment, psychological intervention, and PTSD symptomatology. Additionally, previous studies have examined these variables with other medical conditions such as HIV, AIDS, abortion, and miscarriage. This study is the first to examine these variables in relation to medically diagnosed infertile women in the United States.

The results of the data analysis were presented in Chapter 4. A 2 X 3 factorial ANOVA was conducted using the influence of infertility treatment and psychological intervention, with PTSD as the dependent variable. No statistically significant results were obtained between infertility treatment and PTSD symptomatology, therefore not supporting rejection of the null hypothesis. However, there were statistically significant results between psychological treatment and the infertility treatment and psychological treatment interaction, resulting in rejecting the null hypothesis and accepting the alternative hypothesis.

Additionally, a multiple linear regression was conducted, and statistical significance predictors were found in the four variables FertiQol mind and body, FertiQol social concern, FPI social, and FPI relationship concern. However, FPI relationship scores were the only variable that predicted PTSD symptomatology; FertiQol mind and body, FertiQol social, FPI social concern, and FPI relationship concern indicated decreased PTSD symptomatology. Additionally, because FertiQol mind and body accounted for the highest percentage of PTSD variance, it ranked first in absolute value of semipartial correlations, FPI social ranked second, and FPI relationship and FertiQol social concern ranked third. The participants' FPI need for parenthood, FPI emotional, FPI sexual concern, and rejection of childfree lifestyle were nonsignificant.

Interpretation of the Findings

The current study was based on the theoretical framework of shattered assumptions that was developed by Janoff-Bulman (1992), as well as Cobb's social support and stress buffering theory (1976). Janoff-Bulman's theory suggests that women who are diagnosed as infertile either no longer perceive the world as benevolent and

predictable or see themselves as competent and invulnerable and are prone to experience PTSD symptoms (Edmondson et al., 2011; Park et al., 2012). Additionally, Cobb's theory suggests that because of lack of supportive social relationships, the medically diagnosed infertile woman may be unable to cope with the stressful event of infertility diagnosis and treatment, thus increasing her chance of a deleterious outcome and possibly leading to PTSD (Cohen & Pressman, 2004; Nugent et al., 2011).

The current study examined how an infertility diagnosis and/or fertility treatment interrupts the medically diagnosed infertile woman's worldview and support system because there were limited to no published studies that examined the relationship or the long-term effect of the possible relationship (Gise, 1997). Lukse and Vacc (1999) researched the emotional impact of infertility treatment in women undergoing IVF and ovulation induction, reporting increased signs of distress and depression before, during, and after treatment. Although Lukse and Vacc suggested that the increase was not conclusive to previous failed IVF cycles or other external economic and/or social factors, Vikstrom et al. (2015) reported higher levels of anxiety, depression, and other somatic symptoms among IVF participants who had not become pregnant through infertility treatment.

Additionally, Gise (1997) suggested that shock, disbelief, helplessness, and loss of the ability to procreate and hope for children trigger a stress response that can develop into PTSD. The results of this study concurred with Gise (1997) and Lukse and Vacc (1999) and indicated that advanced infertility treatment had a statistically significant effect and increased the medically diagnosed infertile woman's PTSD symptomatology. However, the increase was only found in participants who had not received psychological

intervention during treatment, and it was not based on whether the individual had received infertility treatment. Therefore, for this research, the infertility treatment and treatment protocol did not increase the person's PTSD symptomatology; rather, as suggested by Frederiksen et al. (2015) and Zaig et al. (2012), it was lack of psychological intervention paired with the individual's infertility treatment protocol that increased PTSD symptomatology in medically diagnosed infertile women. This might explain why PTSD symptomatology was significantly lower in participants who had not received psychological treatment than in those who had received psychological treatment once or throughout their infertility treatment.

This study also analyzed the medically diagnosed infertile woman's problems in communicating openly or constructively about her infertility, as well as in accepting gender differences and addressing concerns about her future relationship. Klock's (2011) reported that 53% of the participants in a national survey of 585 infertile men and women reported relational problems due to their inability to share their sense of guilt, depression, isolation, anxiousness, psychosomatic complaints, and irritable and avoidant behavior with their partners. Rosner (2012) agreed with Klock and suggested that the initial infertility identity and the impact of being infertile and living without children after pursuing treatment have a profound adverse effect on an infertile individual's marriage, relationship, and identity. In the current study, the relationship concern score was the only increased PTSD predictor variable. However, the impact of fertility problems on the participant's physical health was the highest ranking predictor, which was in agreement with previous research that suggested that the stress level in women receiving infertility

treatment is equivalent to that of women with cancer, AIDS, and heart disease (Domar et al., 1993; Frederiksen et al., 2015).

Smeenk et al. (2001) suggested that nonfulfillment of the wish to have a child and prolonged exposure to invasive infertility treatment promoted numerous psychological and social problems for the infertile patient. The current study contradicted these findings and, in agreement with Lukse and Vacc (1999), found that the need for parenthood and other social issues did not increase PTSD symptomatology among medically diagnosed infertile women who had received advanced infertility treatment, indicating that the close identification with the role of parent or parenthood as a primary or essential life goal was not statistically significant among its participants. In agreement with previous research studies, the current study also indicated that the impact of an infertility diagnosis and treatment does affect the medically diagnosed infertile woman's sexual relationship and causes isolation (Howarth, 2011; Ramezanzadeh et al., 2011). The current study also indicates that medically diagnosed infertile women's experiences of loss of enjoyment of sexual relations and sexual self-esteem are connected to their negative view of a child-free lifestyle and difficulty in perceiving any other life role than motherhood as satisfying. Furthermore, the current study contradicted Fahami et al. (2010), who suggested that infertile couples' sexual relationship problems are created by the infertile individual's inability to communicate openly with his or her partner. The participants in the current study reported no significant communication problems with their partners.

The results of the study indicated that advanced infertility treatment increases PTSD symptomatology in medically diagnosed infertile women who do not receive psychological intervention throughout their treatment, and that type of fertility treatment

does not have an impact on PTSD symptomatology in women who receive infertility treatment. It is likely that factors such as relationship concern and physical health contributed to increased PTSD symptoms among the studied population.

Limitations of the Study

There were some limitations that impacted the current study. The study relied entirely on self-report of the participants. Measures were put in place to assure accurate results; however, as Pannucci and Wilkins (2010) suggested, participants may not have answered honestly, may have exaggerated, or may have had selective memory. Furthermore, the results may have been influenced by participant bias.

A second limitation was the exclusion of women from the study who were currently receiving infertility treatment; this exclusion was made in an attempt to minimize harm (APA, 2015). This limited the number of individuals who could complete the study, as well as limited the ability to receive feedback and measure the immediate impact of a fertility diagnosis and treatment.

The third limitation was the inability to understand fully how infertility treatment had increased PTSD symptomatology, and the effect of psychological treatment among the studied population. Although a quantitative study provides statistical data on the studied phenomena, full understanding of the phenomena is limited, and a nonexperimental design fails to provide enough data to draw a definitive conclusion (Bernard, 2011).

Recommendations

The results of this study rejected the hypothesis that there is a significant difference in PTSD symptoms between diagnosed infertile women who undergo

advanced infertility treatment and diagnosed infertile women who do not undergo advanced treatment. The findings suggested that type of fertility treatment does not have a significant impact on PTSD symptomatology in medically diagnosed infertile women. It is recommended that future studies examine the relationship between infertility, infertility treatment, psychological intervention, and PTSD within a qualitative approach. This would provide a better understanding of why fertility treatment did not impact PTSD symptomatology in medically diagnosed infertile women. Qualitative research could be designed to provide an in-depth examination of the fertility experience and fertility treatment from the perspective of study participants. Additionally, the qualitative perspective might provide more comprehensive evidence as to why those who received no psychological treatment had significantly lower PTSD scores than those who received psychological treatment once or throughout their treatment.

A mixed-method analysis is also recommended for future researchers using the FertiQol and FPI. Participants should be given the instruments first to measure their experiences of loss of enjoyment of sexual relations, impaired sexual self-esteem, negative view of a child-free lifestyle, and difficult time perceiving any other life role as satisfying. Then, participants' should be given the opportunity to expand on their experiences, and the short and long-term effect of these experiences should be examined.

In addition, future experimental research should be conducted under controlled conditions wherein the outcome of psychological treatment can be observed in the studied population. Conducting an experimental study would allow the researcher to control the studied variables and evaluate any outside influences. An experimental study would also provide information about the ability to reduce or eliminate PTSD

symptomatology in medically diagnosed infertile women. Before such an experiment is conducted, the PCL-5 should be administered. The participants' responses before and after regarding their PTSD symptomatology could be compared. This would likely provide a more accurate measure of the potential functional relationship between infertility treatment, psychological intervention, and PTSD in medically diagnosed infertile women.

Implications

According to Schwerdtfeger and Shreffier (2009), because of the lack of studies on the impact of infertility and its treatment, more studies that address the psychological consequences as well as the long-term effects on infertility, are needed. Grell (1997) said that both quantitative and qualitative research has a contribution to make to the understanding of the experience of infertility, and Schwerdtfeger and Shreffier stated that this research needs to focus on the effects of the duration of infertility, the experience of treatment, and how the two affect one another. Additionally, it has been suggested that further research is required to define the significant and enduring psychological consequences of the unique trauma related to reproductive problems (Schwerdtfeger & Shreffier, 2009). However, this study is the first to examine the functional relationship between infertility treatment, psychological intervention, and PTSD in medically diagnosed infertile women in the United States.

The result of this study provide many possible outcomes. For although the relationship between infertility treatment and psychological impact was not statistically significant, previous studies have indicated that knowledge of the relationship is necessary for further research development (Delaney, n.d.; Espada & Moreno-Rosset

2008; Griel et al., 2011; Psaros et al., 2014; Schwerdtfeger & Shreffler, 2009. The study provides enhanced knowledge of psychological effects of infertility treatment for the medically diagnosed infertile woman as well as possible long-term issues related to infertility treatment, and it opens the door for future research about the effectiveness of psychological intervention, particularly during advanced infertility treatment. The study also provides awareness to the reproductive health care provider and the medically diagnosed infertile woman of possible PTSD susceptibility. Lastly, the study provides a baseline of information on the relationship between an infertility diagnosis, fertility treatment, psychological intervention, and PTSD.

Conclusion

Throughout the United States, the number of medically diagnosed infertile women rises every year. Researchers have indicated that this invisible medical condition not only affects a person's social status, but also causes considerable emotional and psychological distress. Although infertility has been widely researched, limited to no research has been conducted on the potential functional relationship between infertility treatment, psychological intervention, and PTSD.

It is important to study the psychological effect in medically diagnosed infertile women because research indicates that the impact is comparable to that experienced by those facing life-threatening illnesses that have been linked to PTSD. Increased stress levels and stress-level-reduction methods have been examined in individuals receiving infertility treatment. However, no study has examined the variables to determine the psychological impact of infertility treatment and PTSD.

The theoretical framework for the study was based on Janoff-Bulman's cognitive appraisal theory and Cobb's social support and stress-buffering theory. A nonexperimental quantitative study was conducted with medically diagnosed infertile women. The survey instruments examined the participants' demographics; the 20 DSM 5 symptoms of PTSD; the psychological impact of fertility problems and their treatment; if and how an infertility diagnosis, fertility treatment, and psychological intervention affect the infertile individual, and the possible long-term consequences. The results of the study indicated that type of infertility treatment does not have a statistical impact on PTSD symptomatology in medically diagnosed women. However, the main effect of psychological treatment was significant, as was infertility treatment by psychological treatment interaction, but only for those who did not receive infertility treatment. Further, the results of the study indicated that relationship issues influenced PTSD symptoms among participants.

Additionally, the impact of fertility problems on the participant's physical health was the highest ranking predictor, which suggests that stress levels in women receiving infertility treatment might support the statement made by Domar et al. (1993) and Frederiksen et al. (2015), that the stress levels in women receiving infertility treatment are equivalent to those of women with cancer, AIDS, and heart disease. This research study is important because it fills a gap in the existing literature by examining the functional relationship between infertility treatment, psychological intervention, and PTSD in medically diagnosed infertile women in the United States. Continued research in this area is needed because it may provide reproductive health care providers with enhanced knowledge of the psychological effects of infertility treatment for medically

diagnosed infertile women. Examining the possible long-term issues of infertility treatment and the effectiveness of a psychological intervention, particularly during advanced infertility, can lead to a better health care outcome for the medically diagnosed infertile woman.

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Appendix A: Demographic Survey

1. ***What is your marital status***

- Married
- Single
- Divorced
- Separated
- Never married
- Widowed
- Other (Specify)

2. What is your age?

- 24-34 years old
- 35-44 years old

3. ***What is the highest level of education you have completed?***

- Some high school
- High school graduate
- Some college
- Trade/technical/vocational training
- College graduate
- Some postgraduate work
- Post graduate degree
- Other (please specify)

4. What is your employment status?

- Employed
- Self-employed
- Out of work looking for work
- Out of work not currently looking for work
- A homemaker
- A student
- Retired

- Unable to work
- Something else (please specify)

5. What is your annual income?

- Less than $10,000
- $10.000 to $19,999
- $20,000 to $29,000
- $30,000 to $39,999
- $40,000 to $49,999
- $50,000 to $59,999
- $60,000 to $69,999
- $70,000 to $79,999
- $80,000 to $89,999
- $90,000 to $99,999
- $100,000 to $149, 999
- $150,000 to more

6. What is your religious preference?

- Christian Scientist
- Seventh-Day Adventist
- Protestant
- Jewish
- Orthodox church such as the Greek or Russian Orthodox Church
- Mormon
- Muslim
- Roman Catholic
- Something else (please specify)

7. What is your race/ethnicity? Mark one or all that apply.

- White
- Black or African-American, or Negro
- Asian Indian

- Chinese
- Filipino
- Japanese
- Korean
- Vietnamese
- Other Asian (please specify)

- Native Hawaiian
- Guamanian or Chamorro
- Samoan
- Other Pacific Islander (please specify)

- American Indian or Alaska Native
- Other (please specify)

8. Did you undergo any type of fertility treatment (please mark all relevant answers)

- IUI
- IVF
- GIFT/ZIFT
- No
- Other (please specify)

9. Was your last infertility treatment?

- 12 months ago
- 24 months ago
- 36 months ago
- Does not apply
- Other (please specify)

10. I have (please complete)

- Had a chemical pregnancy

- Had one or more miscarriages
- Given birth
- Adopted
- No children

11. Have you received any psychological intervention after diagnosis?

- I never sought therapy after infertility diagnosis or infertility treatment
- I received therapy once after diagnosis or infertility treatment
- I received therapy throughout infertility treatment
- If answered throughout, please specify how often (ex. 2 x's a week, once a month, etc.)

Appendix B: Permission to Use the PCL-5

Yoder, Matthew S **<Matthew.Yoder@va.gov>** 5/18/15

to me

Greetings, and thank you for your assessment instrument request.

You may access National Center for PTSD assessment measures by following the link below:
http://www.ptsd.va.gov/professional/assessment/documents/ptsd_trauma_assessments.asp

These assessment tools were created by government employees and therefore are not copyrighted. In accordance with the American Psychological Association's ethical guidelines, these instruments are intended for use by qualified health professionals with advanced graduate training in psychodiagnostic assessment.

Please let us know if you have any difficulties downloading these instruments. Also, no thank you email is necessary.

Finally, if you are a mental health provider working with United States Veterans, we want to make you aware of our PTSD Consultation Program. It is available to ANYONE working in Mental Health with US Veterans who have PTSD. Our consultants are available to answer questions about anything related to PTSD and to provide one-on-one consultation by phone or email. You can contact them anytime at PTSDconsult@va.gov or 866-948-7880.

Sincerely,
National Center for PTSD Staff

Subscribe to the PTSD Monthly Update
http://www.ptsd.va.gov/about/subscribe.asp

Matthew Yoder, Ph.D.
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PTSD Consultation Program
National Center for PTSD, Executive Division
matthew.yoder@va.gov
(804) 246-9984

866-948-7880 or PTSDconsult@va.gov

More ways to connect with the National Center for PTSD:

PTSD Assessment Tools

Here you can download clinician-administered assessment instruments created by the National Center for PTSD. A number of other National Center measures are available for download on the information page for the instrument. See a list of all measures on the Center's website.

Clinician-Administered PTSD Scale (CAPS)

The CAPS is the gold standard in PTSD assessment. The CAPS is a 30-item structured interview that corresponds to the DSM criteria for PTSD. As part of the trauma assessment (Criterion A), the Life Events Checklist (LEC) is also used to identify experience of traumatic stressors experienced. For general information about the CAPS for DSM-IV and CAPS-5, see CAPS Information. Note: Additional formats of the Life Events Checklist for DSM-5 (LEC-5) can be found here LEC-5 Information

Download CAPS for DSM-5:

- CAPS-5 - past week (PDF)
- CAPS-5 - past month (PDF)
- CAPS-5 - worst month (PDF)
- LEC-5 (standard self-report) (PDF)

Download CAPS for DSM-IV:

- CAPS for DSM-IV (PDF)
- CAPS for DSM-IV Psychometric Info (PDF)
- CAPS for DSM-IV Manual (PDF)
- LEC for DSM-IV (PDF)

(a) Clinician-Administered PTSD Scale for Children/Adolescents (CAPS-CA)

The CAPS-CA is a clinician-administered PTSD scale for children and adolescents. It is a modified version of the CAPS. More about the *DSM-IV* and *DSM-5* versions of this measure is available: CAPS-CA-5 Information.

Download CAPS-CA-5:

- CAPS-CA-5 (PDF) - includes general instructions and scoring information

Download CAPS-CA for DSM-IV:

- CAPS-CA (PDF)
- CAPS-CA Icons (PDF)
- CAPS-CA Chart (PDF)

Appendix C: PCL-5 Survey

Instructions: Below is a list of problems that people sometimes have in response to a very stressful experience. Please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

In the past month, how much were you bothered by:	**Not at all**	**A little bit**	**Moderately**	**Quite a bit**	**Extremely**
1. Repeated, disturbing, and unwanted memories of the stressful experience?	0	1	2	3	4
2. Repeated, disturbing dreams of the stressful experience?	0	1	2	3	4
3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?	0	1	2	3	4
4. Feeling very upset when something reminded you of the stressful experience?	0	1	2	3	4
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?	0	1	2	3	4
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	0	1	2	3	4
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?	0	1	2	3	4
8. Trouble remembering important parts of the stressful experience?	0	1	2	3	4
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world completely dangerous)?	0	1	2	3	4

10. Blaming yourself or someone else for the stressful experience or what happened after it?	0	1	2	3	4
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	0	1	2	3	4
12. Loss of interest in activities that you used to enjoy?	0	1	2	3	4
13. Feeling distant or cut off from other people?	0	1	2	3	4
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?	0	1	2	3	4
15. Irritable behavior, angry outbursts, or acting aggressively?	0	1	2	3	4
16. Taking too many risks or doing things that could cause you harm?	0	1	2	3	4
17. Being "superalert" or watchful or on guard?	0	1	2	3	4
18. Feeling jumpy or easily startled?	0	1	2	3	4
19. Having difficulty concentrating?	0	1	2	3	4
20. Trouble falling or staying asleep?	0	1	2	3	4

Appendix D: Public Permission to Use and Download the FertiQol Survey

Download FertiQoL

Before downloading any FertiQoL PDF's please read the following **terms and conditions of use**.

1. You must use FertiQoL as it is without making any changes to the items, order of items, instructions or response scales. **PLEASE DO NOT DO YOUR OWN TRANSLATION**. We have a translation procedure in place. If you detect an error or a problem, or want a translation into another language or to give us some feedback then email us at **fertiqol@cardiff.ac.uk**.

2. FertiQoL is free to use but you must acknowledge the sponsors in any publication. Please cite either of the following two publications if you intend to use FertiQoL:

Boivin, J, Takefman, J, Braverman, A. (2011). Development and preliminary validation of the fertility quality of life (FertiQoL) tool. *Human Reproduction, 26*(8), 2084–2091. [**pdf**]

Boivin, Takefman & Braverman. (2011) The Fertility Quality of Life (FertiQoL) tool: development and general psychometric properties.*Fertility and Sterility, 96*, 409-15. [**pdf**]

3. Please do not distribute FertiQoL to other researchers or clinicians for their use. Please ask them to visit this website.

4. If you are doing research then at the end of your project we would be grateful if you could send us the sample size for your project, and means and standard deviations for each FertiQoL subscale for our monitoring purposes via email at **fertiqol@cardiff.ac.uk**.

Languages available

Click on the language to access the required FertiQoL pdf

English
Arabic
Arabic for Tunisia
Bulgarian

Chinese (Simplified)
Chinese (Traditional)
Croatian
Danish
Dutch
Farsi
Finnish
French
German
Greek
Hebrew
Hungarian
Italian
Indonesian
Japanese
Kannada
Korean
Lithuanian
Malayalam
Malaysian
Maltese
Polish
Portuguese
Brazil Portuguese
Romanian
Russian
Serbian
Spanish
Swedish
Turkish
Urdu
Vietnamese
Welsh

Appendix E: The FertiQol Survey

Fertility Quality of Life Questionnaire (2008)

For each question, kindly check (tick the box) for the response that most closely reflects how you think and feel.

Relate your answers to your current thoughts and feelings. Some questions may relate to your private life, but they are necessary to adequately measure all aspects of your life.

Please complete the items marked with an asterisk (*) only if you have a partner.

	For each question, check the response that is closest to your current thoughts and feelings	Very Poor	Poor	Either Good	Good	Very Good
A	How would you rate your health?	o	o	o	o	o
	For each question, check the response that is closest to your current thoughts and feelings	Very Dissatisfied	Dissatisfied	Neither Satisfied Nor	Satisfied	Very Satisfied
B	Are you satisfied with your quality of life?	o	o	o	o	o
	For each question, check the response that is closest to your current thoughts and feelings	Completely	A Great Deal	Moderately	Not Much	Not At All
Q1	Are your attention and concentration impaired by thoughts of infertility?	o	o	o	o	o
Q2	Do you think you cannot move ahead with other life goals and plans because of fertility problems?	o	o	o	o	o
Q3	Do you feel drained or worn out because of fertility problems?	o	o	o	o	o
Q4	Do you feel able to cope with your fertility problems?	o	o	o	o	o
	For each question, check the response that is closest to your current thoughts and feelings	Very Dissatisfied	Dissatisfied	Neither Satisfied Nor	Satisfied	Very Satisfied
Q5	Are you satisfied with the support you receive from friends with regard to your fertility problems?	o	o	o	o	o
*Q6	Are you satisfied with your sexual relationship even though you have	o	o	o	o	o
	For each question, check the response that is closest to your current thoughts and feelings	Always	Very Often	Quite Often	Seldom	Never
Q7	Do your fertility problems cause feelings of jealousy and resentment?	o	o	o	o	o
Q8	Do you experience grief and/or feelings of loss about not being able to have a child (or more children)?	o	o	o	o	o
Q9	Do you fluctuate between hope and despair because of fertility problems?	o	o	o	o	o
Q10	Are you socially isolated because of fertility problems?	o	o	o	o	o
*Q11	Are you and your partner affectionate with each other even though you have fertility problems?	o	o	o	o	o

Q12	Do your fertility problems interfere with your day-to-day work or obligations?	o	o	o	o	o
Q13	Do you feel uncomfortable attending social situations like holidays and celebrations because of your fertility problems?	o	o	o	o	o
Q14	Do you feel your family can understand what you are going through?	o	o	o	o	o
	For each question, check the response that is closest to your current thoughts and feelings	An Extreme Amount	Very Much	A Moderate Amount	A Little	Not At All
*Q15	Have fertility problems strengthened your commitment to your partner?	o	o	o	o	o
Q16	Do you feel sad and depressed about your fertility problems?	o	o	o	o	o
Q17	Do your fertility problems make you inferior to people with children?	o	o	o	o	o
Q18	Are you bothered by fatigue because of fertility problems?	o	o	o	o	o
*Q19	Have fertility problems had a negative impact on your relationship with your partner?	o	o	o	o	o
*Q20	Do you find it difficult to talk to your partner about your feelings related to infertility?	o	o	o	o	o
*Q21	Are you content with your relationship even though you have fertility problems?	o	o	o	o	o
Q22	Do you feel social pressure on you to have (or have more) children?	o	o	o	o	o
Q23	Do your fertility problems make you angry?	o	o	o	o	o
Q24	Do you feel pain and physical discomfort because of your fertility problems?	o	o	o	o	o

Optional Treatment Module

If you started fertility treatment (this includes any medical consultation or intervention)? If Yes, then please respond to the following questions. For each question, kindly check (tick the box) for the response that most closely reflects how you think and felt. Relate your answers to your thoughts and feelings. Some questions may relate to your private life, but they are necessary to adequately measure all aspects of your life.

	For each question, check the response that is closest to your current thoughts and feelings	Always	Very Often	Quite often	Seldom	Never
T1	Does infertility treatment negatively affect your mood?	□	□	□	□	□
T2	Are the fertility medical services you would like available to you?	□	□	□	□	□

	For each question, check the response that is closest to your current thoughts and feelings	An Extreme Amount	Very Much	A Moderate Amount	A Little	Not At All
T3	How complicated is dealing with the procedure and/ or administration of medication for your infertility treatment(s)?	☐	☐	☐	☐	☐
T4	Are you bothered by the effect of treatment on your daily or work- related activities?	☐	☐	☐	☐	☐
T5	Do you feel the fertility staff understand what you are going through?	☐	☐	☐	☐	☐
T6	Are you bothered by the physical side effects of fertility medications and treatment?	☐	☐	☐	☐	☐

	For each question, check the response that is closest to your current thoughts and feelings	Very Dissatisfied	Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Very Satisfied
T7	Are you satisfied with the quality of services available to you to address your emotional needs?	☐	☐	☐	☐	☐
T8	How would you rate the surgery and/or medical treatment(s) you have received?	☐	☐	☐	☐	☐
T9	How would you rate the quality of information you received about medication, surgery and/or medical treatment?	☐	☐	☐	☐	☐
T10	Are you satisfied with your interactions with fertility medical staff?	☐	☐	☐	☐	☐

Appendix F: Permission to Use the Fertility Problem Inventory

Antoinette Corley-Newman Jan 28

to cnewton

Hello Dr. Newton

Thank you for accepting my call, again, what a relief. As I mentioned my research is looking at the relationship of the infertility diagnosis, infertility treatment, mental health intervention and PTSD. So I come to you with a request to gain permission to utilize the FPI, as well as to obtain a downloadable copy of the instrument.

Thank you again for your assistance.

Antoinette Newman

Christopher Newton Jan 28

to me

Antoinette:

You have my full permission to use The Fertility Problem Inventory in your research. I have attached copy of the questionnaire and also a version with a condensed format which you are free to use. I have also attached a copy of the scoring key and the norms derived from women and men seeking hospital based infertility treatment.

Christopher Newton Ph.D. C. Psych

Appendix G: The Fertility Problem Inventory Survey

Fertility Problem Inventory (FPI) The following statements express different opinions about a fertility problem. Please indicate the degree to which you agree or disagree with each statement. If you have a child, please answer the way you feel right now, after having a child.

	Strongly Agree	Moderately Agree	Slightly Agree	Slightly Disagree	Moderately Disagree	Strongly Disagree
1. Couples without a child are just as happy as those with children.	○	○	○	○	○	○
2. Pregnancy and childbirth are the two most important events in a couple's relationship.	○	○	○	○	○	○
3. I find I've lost my enjoyment of sex because of the fertility problem.	○	○	○	○	○	○
4. I feel just as attractive to my partner as before.	○	○	○	○	○	○
5. For me, being a parent is a more important goal than having a satisfying career	○	○	○	○	○	○
6. My marriage needs a child (or another child).	○	○	○	○	○	○
7. I don't feel any different from other members of my sex.	○	○	○	○	○	○
8. It's hard to feel like a true adult until you have a child.	○	○	○	○	○	○
9. It doesn't bother me when I'm asked questions about children.	○	○	○	○	○	○
10. A future without a child (or another child) would frighten me.	○	○	○	○	○	○
11. I can't show my partner how I feel because it will make him/her feel upset.	○	○	○	○	○	○
12. Family don't seem to treat us any differently.	○	○	○	○	○	○
13. I feel like I've failed at sex.	○	○	○	○	○	○
14. The holidays are especially difficult for me.	○	○	○	○	○	○
15. I could see a number of advantages if we didn't have a child (or another child).	○	○	○	○	○	○
16. My partner doesn't understand the way the fertility problem affects me.	○	○	○	○	○	○
17. During sex, all I can think about is wanting a child (or another child).	○	○	○	○	○	○
18. My partner and I work well together handling questions about our infertility.	○	○	○	○	○	○
19. I feel empty because of our fertility problem.	○	○	○	○	○	○

20. I could visualize a happy life together, without a child (or another child).	○	○	○	○	○	○
21. It bothers me that my partner reacts differently to the problem.	○	○	○	○	○	○
22. Having sex is difficult because I don't want another disappointment.	○	○	○	○	○	○
23. Having a child (or another child) is not the major focus of my life.	○	○	○	○	○	○
24. My partner is quite disappointed with me.	○	○	○	○	○	○
25. At times, I seriously wonder if I want a child (or another child).	○	○	○	○	○	○
26. My partner and I could talk more openly with each other about our fertility problem.	○	○	○	○	○	○
27. Family get-togethers are especially difficult for me.	○	○	○	○	○	○
28. Not having a child (or another child) would allow me time to do other satisfying things.	○	○	○	○	○	○
29. I have often felt that I was born to be a parent.	○	○	○	○	○	○
30. I can't help comparing myself with friends who have children.	○	○	○	○	○	○
31. Having a child (or another child) is not necessary for my happiness.	○	○	○	○	○	○
32. If we miss a critical day to have sex, I can feel quite angry.	○	○	○	○	○	○
33. I can't imagine us ever separating because of this.	○	○	○	○	○	○
34. As long as I can remember, I've wanted to be a parent.	○	○	○	○	○	○
35. I still have lots in common with friends who have children.	○	○	○	○	○	○
36. When we try to talk about our fertility problems, it seems to lead to an argument.	○	○	○	○	○	○
37. Sometimes I feel so much pressure, that having sex becomes difficult.	○	○	○	○	○	○
38. We could have a long, happy relationship without a child (or another child).	○	○	○	○	○	○
39. I find it hard to spent time with friends who have young children.	○	○	○	○	○	○
40. When I see families with children I feel left out.	○	○	○	○	○	○
41. There is a certain freedom without children that appeals to me.	○	○	○	○	○	○
42. I will do just about anything to have a child (or another child).	○	○	○	○	○	○

43. I feel like friends or family are leaving us behind.	○	○	○	○	○	○
44. It doesn't bother me when others talk about their children.	○	○	○	○	○	○
45. Because of infertility, I worry that my partner and I are drifting apart.	○	○	○	○	○	○
46. When we talk about our fertility problem, my partner seems comforted by my comments.	○	○	○	○	○	○

Appendix H: Participant Invitation

The Infertility Experience

Antoinette Corley-Newman, a Ph.D. clinical doctoral student at Walden University (under the advisory of Dr. Arcella Trimble), is performing a study of medical diagnosed infertile women and their infertility experience throughout their choice of infertility treatment.

Women may be eligible to participate if they are aged 24 - 44 years and:

- Have a medical infertility diagnosis (not due to genetic factors)
- May or may not have gone through fertility treatment (successful or unsuccessful)
- Completed their last fertility treatment at least 12 months and no longer than three years before study
- May or may not have received psychological intervention throughout their infertility protocol
- Have the ability to understand and read English well enough to independently participate

You are invited to complete the study online at https://infertilityexperiencesurvey.co1.qualtrics.com/SE/?SID=SV_0futEBF4pVHoC3j. The study will take 30-45 minutes to complete. No compensation is offered for participation. Your participation is strictly voluntary and confidential.

If you are interested in learning more about this study, please contact Antoinette Corley-Newman.

Appendix I: Consent Form

CONSENT FORM

You are invited to take part in a research study of exploration of the infertility experience. The researcher is inviting women between the ages of 24 – 44 who have received a infertile medical diagnosis (not due to genetic factors) and who may or may not have received fertility treatment or psychological intervention to participate in the study. If you are NOT CURRENTLY receiving fertility treatments and you HAVE been free from fertility treatments for at least 12 months and NOT more than 3 years, please continue. Additionally, if you are able to understand and read English independently, please continue. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

A researcher named Antoinette Corley-Newman, who is a clinical psychology doctoral candidate at Walden University, is conducting this study.

Background Information:
The purpose of this study is to better understand the impact of an infertility medical diagnosis on women's lives. I am interested in understanding the emotions the infertile woman's experience from the initial diagnosis and through out and after the experience of trying to have a baby.

Procedures:
If you agree to be in this study, you will be asked to:

- Complete the survey in one sitting,
- Allow 30 – 45 minutes to complete the study.
- Take a confidential online survey from a computer of your choice detailing your fertility experience
- Additionally, a summary of study results will be distributed for website posting to the various reproductive and fertility organizations and social media sites that posted initial research study invitation.

Here are some sample questions:

1. Couples without a child are just as happy as those with children.

2. Because of infertility, I worry that my partner and I are drifting apart
3. Do you fluctuate between hope and despair because of fertility problems?
4. Do you feel sad and depressed about your fertility problems?
5. Feeling very upset when something reminded you of the stressful experience?
6. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?

Voluntary Nature of the Study:
This study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:
Being in this type of study involves some risk of the minor discomforts that can be encountered in daily life, such as emotional discomfort and distress. Being in this study would not pose risk to your safety or wellbeing. In case you want to talk with someone, you can find a comprehensive list of reproductive mental health care providers at the following website: http://www.resolve.org/resources/professional-services/directory-results.html?service_area=mental-health (RESOLVE is a National infertility association)

There are no other direct benefits. However, you may feel satisfaction for contributing to research that may provide new understanding regarding a woman's experience with infertility. Health care providers as well as other women and their family members may benefit from this information and knowledge.

Payment:
There is no compensation for participation.

Privacy:
Any information you provide will be kept anonymous. The researcher will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in the study reports. Data will be kept secure by an SSL encryption that allows for disabling IP address tracking. Data will be kept for a period of at least 7 years, as required by the university.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher via antoinette.corley-newman@waldenu.edu. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Walden University's approval number for this study is 06-17-16-0296647 and it expires on June 16, 2017. Please print or save this consent form for your records.

Statement of Consent:

I have read the above information, and I feel I understand the study well enough to make a decision about my involvement. Your completion of the survey indicates you are at least 18 years of age, you understand and agree to the terms described above, and you consent to participation in the study.