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The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility

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**Background:** Infertility, or the inability to conceive or carry a pregnancy to live birth, affects one in sixteen married women. Stress that arises from infertility treatment may affect marital interaction, specifically, satisfaction. An emerging approach in infertility diagnosis and treatment called NaProTECHNOLOGY (NPT) may benefit marital interactions; however, no studies have explored marital satisfaction in this specific population. **Objectives:** To examine demographic variables and marital satisfaction scores in couples with infertility who are using NPT. **Methods:** A quantitative, descriptive, cross-sectional study was completed utilizing demographic surveys and the Index of Marital Satisfaction (IMS). **Results:** The sample consisted of 36 couples with mean ages of 34.67 years for men and 33.31 years for women; most were White, held at least a bachelor’s degree, employed, had an annual income of $75,000 or greater, and Catholic. Mean IMS scores were 12.08 for men and 11.75 for women, indicating marital satisfaction. Paired t-tests demonstrated no statistical significant difference between genders (p = 0.772), but did show a positive Pearson correlation of 0.672. A scatter plot demonstrated a positive relationship with a linear regression ($r^2$) of 0.451. There were no statistically significant relationships between IMS scores and demographic variables. **Conclusions:** The majority of couples reported marital satisfaction. It is difficult to determine if this is related to the demographics of the respondents or related to NPT. **Implications for Nursing:** Nurse practitioners should be aware of the potential effect infertility and treatment can have on marital satisfaction. Future studies are necessary to further explore and expand this topic.
Anna Camacho-University of Connecticut (2018)

*Keywords*: NaProTECHNOLOGY; marital interaction; marital satisfaction; infertility
The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility

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2018
APPROVAL PAGE

Doctoral of Nursing Practice Dissertation

The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility

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University of Connecticut
[2018]

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Dedication

This work is dedicated to God, my loving husband, Jaime Camacho, and our precious children both here and above, who provided me the inspiration and support to complete this dissertation. I also dedicate this work to all the men and women who are struggling with infertility.
Acknowledgments

Completion of this dissertation would not have been possible without the support of many individuals. First, I would like to thank my dissertation committee for their undivided attention, wisdom, patience, and collaboration. Thank you to my major adviser, Dr. Annette Jakubisin-Konicki, who has mentored and guided me throughout this entire challenging process. To Dr. Jacqueline McGrath, who provided expertise in research design and statistical analysis to guide me in designing this study. Thank you to Dr. Paul Carpentier whose expertise in the subject matter and in research has provided me encouragement and challenged me to improve my work. I would like to thank my readers, Drs. Joseph Stanford and Natalie Keifer, who provided feedback and corrections to develop my writing. A special thanks to Dr. Stephen Walsh, who assisted with statistical analysis and provided much needed encouragement.

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Chapter One: The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility

A marital relationship faces numerous trials and tribulations when confronted with infertility. The couple’s past experiences, coping mechanisms, and adaptation processes in response to infertility affects the couple’s marital interaction, specifically, marital satisfaction. Although there are numerous studies examining marital satisfaction within couples with infertility, there are no known studies that specifically explore marital satisfaction in couples pursuing Natural Procreative Technology, better known as NaProTECHNOLOGY (NPT), described in detail in a section below. This relatively new approach focuses on the diagnosis and treatment of underlying conditions to restore natural fertility. In addition to treating infertility, NPT has approaches for recurrent miscarriages, pre-menstrual syndrome, polycystic ovarian disease, menstrual cramping, irregular cycles, hormone imbalances, pre-menopause, ovarian cysts, post-partum depression, and other reproductive- or gynecological-related issues (Hilgers, 2004). During the NPT evaluation and treatment of infertility, women and couples may feel empowered through active participation in their care.

Infertility can cause physical and mental suffering as well as place strains on a marriage leading to higher divorce rates (Kjaer, Albieri, Jensen, Kjaer, Johansen, & Dalton, 2014). Family practice healthcare providers must assist couples working through these challenges to provide comprehensive care. The diagnostic workup and treatment plan has the potential to increase or decrease stress, which in turn affects marital satisfaction levels. Thus, the method of diagnosis and treatment needs to be evaluated for its effect on marital satisfaction. The purpose of this descriptive study is to evaluate marital satisfaction in couples with infertility using NPT to provide a foundation for future research. The aims of this dissertation were to describe marital satisfaction scores within couples as well as examine differences between men and women.
Furthermore, the relationship between marital satisfaction and demographic variables were analyzed.

In order to properly assess this subject matter, a good understanding of what infertility is, how it is treated, and its impact on couple relationships must be outlined. The focus of this chapter is to provide background information on infertility, its significance to nursing, and the purpose of the current study. The Vulnerability-Stress-Adaptation (VSA) Model of Marriage served as the theoretical framework guiding the dissertation given its relevance and well-published evidence for utilization in other studies examining infertility.

**Infertility Definition and Prevalence**

Primary infertility is the inability to ever bear a child whether it is due to the inability to become pregnant or to carry the pregnancy to a live birth (World Health Organization [WHO], 2015). Secondary infertility, on the other hand, is the inability to bear a child after a woman has already given birth or had the capability to do so, such as in cases of stillborns. Impaired fecundity represents the decreased ability to conceive or carry a pregnancy to term. According to the United States Centers for Disease Control and Prevention (CDC) (2015), an estimated 6.7 million women between the ages of 15–44 years have impaired fecundity, which equates to 10.9% of women within that age range. There are 1.5 million married women of ages 15–44 years reported as infertile, which equates to 6% or one in sixteen married women. Women who have ever used infertility treatment services in this same age range number 7.4 million, or 11% of all women (CDC, American Society for Reproductive Medicine, and Society for Assisted Reproductive Technology, 2017). The age range of 15–44 years utilized in these statistics is a standard range to approximate the years of female reproductive capacity. The WHO (2015) estimates that one in every four couples in developing countries encounters infertility.
Furthermore, this statistic and estimated burden of infertility has remained constant from 1990 to 2010 in the 190 countries evaluated (WHO, 2015).

**Current Approach to Diagnosis and Treatment**

The causes of infertility include ovulation factors such as polycystic ovarian disease, pelvic factors such as endometriosis, fallopian tube occlusion, adhesions, and cervical abnormalities, and male factors (DeCherney, Nathan, Laufer, & Roman, 2013). Use of NPT has demonstrated that underlying causes are often multi-factorial, and the top associated factors are endometriosis, target organ dysfunction, ovulation-related disorders, and luteal phase deficiencies. Severe oligospermia (decreased sperm count) affects 8.1% of infertile couples and azoospermia (absence of sperm) affects 1.7% of infertile couples (Hilgers, 2004).

NPT, sometimes termed restorative reproductive medicine, views infertility only as a symptom of several chronic disorders. A recent report of ART success rates reported that 10% of couples had an “unexplained” infertility diagnosis when presenting to an IVF center (CDC, American Society for Reproductive Medicine, and Society for Assisted Reproductive Technology, 2017). In contrast, all couples who complete a full NPT workup will receive at least one underlying cause for infertility (Hilgers, 2004). In other studies, 40 to 47% of women had an unexplained infertility diagnosis prior to NPT evaluation, and after NPT evaluation, only 0.5 to 1% received an unexplained infertility diagnosis (Tham, Schiep, & Stanford 2012; Stanford, Parnell, & Boyle, 2008). Furthermore, in 29% of women diagnosed with at least one unexplained miscarriage prior to NPT evaluation, only 2% were diagnosed with unexplained miscarriages after NPT evaluation (Tham, Schiep, & Stanford, 2012). The most common diagnoses after NPT evaluation were anovulation, polycystic ovarian syndrome, low progesterone, low estrogen, and limited cervical mucus (Tham, Schiep, & Stanford 2012; Stanford, Parnell, & Boyle, 2008).
Having a diagnosis not only helps guide treatment, but may also alleviate some stress for a couple as they are able to undertake infertility as a medical condition.

**Assisted Reproductive Technology**

One form of infertility treatment is the use of assisted reproductive technology (ART), defined as any procedure that involves handling sperm or eggs (CDC, 2014). Examples of ART procedures are intrauterine insemination (IUI) and IVF. IUI describes a procedure by which sperm that has been washed and concentrated is injected directly into the uterus during the time of active ovulation to have an injected sperm cell travel to the fallopian tube to fertilize one of the released eggs. The procedure is often complemented by pharmaceutical agents to promote ovulation (Sunderam et al., 2018).

According to the 2015 Assisted Reproductive Technology Fertility Clinic Success Rates Report, the most common form of ART is IVF (Sunderam et al., 2018). This process entails extraction of a woman’s eggs often after the use of ovulation stimulating drugs. Next, the eggs are combined with sperm from her significant other in a fluid medium, typically in a petri dish, where they are left for up to 6 days for fertilization to occur. One or more embryos are then reintroduced into the woman’s uterus. In some cases, the IVF process includes the use of donor eggs, donor sperm, or surrogate mothers. Intracytoplasmic sperm injection (ICSI) is a form of IVF where a single sperm cell is injected into the cytoplasm of a mature oocyte (egg) and is often used with male factor infertility (Sunderam et al., 2018). ICSI is also the most common form of ART, accounting for 66% of ART procedures (CDC, American Society for Reproductive Medicine, and Society for Assisted Reproductive Technology, 2017).

According to the CDC, in 2015, there have been 59,334 live born infants resulting from 182,111 cycles of ART, a majority being IVF (Sunderam et al., 2018). This is equivalent to an approximate 32.6% success rate per cycle. According to statistics through the United Kingdom’s
Human Fertilisation and Embryology Authority, there were 266,227 embryos created in 2011. In the same year, the IVF transfer number was 89,648 embryos, which resulted in 11,532 pregnancies. The remainder of the embryos are frozen, donated, discarded, or used for research (HFEA, 2017).

Furthermore, studies show that IVF is not without risk. Shevell et al. (2005) compared women who used ART to those who did not and found that IVF patients were 6 times more likely to have placenta previa, 2.7 times more likely to have pre-eclampsia, and 2.3 times more likely to undergo cesarean delivery. With ovulation induction, women were 2.4 times more likely to have placental abruption and 2.1 times more likely to have a fetal loss after 24 weeks of gestation (Shevell et al., 2005). Another study found that 8.6% of infants conceived via ICSI had a major birth defect diagnosed by one year of age as compared to 4.2% diagnosed in naturally conceived infants (Hansen, Kurinczuk, De Klerk, Burton, & Bower, 2012).

**Medical NaProTECHNOLOGY**

NPT, in contrast to ART, treats underlying conditions to promote natural conception. The foundation for NPT is the use of the Creighton Model System (CrMS), which is the systematic, standardized observation and recording of various biomarkers, including menstruation or other bleeding, cervical mucus, vaginal discharge, and absence of discharge. Women identify their “peak day” based on specific criteria and a dramatic change in mucus. Hilgers (2004) found that 99.9% women ovulated up to 2 days prior to peak day and up to 3 days after peak day, thus the peak day is used to determine the time of ovulation.

Teachers of the CrMS utilize a standardized approach in teaching women how to chart their cycles. They also are trained to refer couples for medical NPT evaluation and treatment whenever certain situations are revealed. Women taught develop a good understanding of their fertility cycles and can determine ovulation, and the follicular and luteal phases of their cycles.
Teachers and women can score the cervical mucus cycles as dry, normal, or limited, since low mucus cycle scores can negatively affect fertility. Clinicians assess the recorded fertility cycles to identify patterns or abnormalities. Furthermore, laboratory tests are ordered in conjunction with charting and often correlate with the woman’s observations on the chart. Individual charting patterns also guide timing for ultrasound testing for follicle quantity and quality (Hilgers, 2004). Fertility cycles can vary from woman to woman and from cycle to cycle. With the CrMS, providers assess an individual’s cycle allowing for customized care.

A treatment plan is devised utilizing the CrMS recordings and diagnostic evaluation. The patient’s CrMS chart is regularly re-assessed to observe for improvements and the response to treatment. Mucus enhancers, such as Vitamin B6, improve the quality and quantity of cervical mucus especially in cases of limited or dry cycles or in couples with oligospermia. Ovulation inducing medications, such as clomiphene citrate or letrozole, are used in the lowest doses necessary to facilitate the development of a mature follicle while minimizing the chance of multiple ovulation and ovarian hyper-stimulation syndrome, which is a dangerous condition causing rapid weight gain, abdominal pain, nausea, vomiting, diarrhea, and the ovaries to become swollen and painful.

Low-dose naltrexone is a medication often used in NPT to improve ovarian function through its competitive antagonist effect on the opiate receptors, which subsequently increases β-endorphin levels. Standard dosing of naltrexone is useful in treating hypothalamic amenorrhea by facilitating menstrual cycles. One cause of hypothalamic amenorrhea is theorized to be psychogenic stress, and its effect on reproduction seems to be related to β-endorphin and its connection to the secretion of gonadotropins (Hilgers, 2004).

One of the hallmarks of NPT treatment is cooperative estrogen and progesterone replacement or supplementation. When natural levels are low, NPT providers prescribe bio-
identical forms of estrogen and progesterone. Women are instructed to take progesterone in the post-ovulatory phase of the cycle, as it can inhibit ovulation when used in the pre-ovulatory phase. It is therefore essential for women to chart their cycles with CrMS to correctly identify each phase of the cycle. Use of these hormones can help normalize fertility cycle length and quality. Also, hormone supplementation can have beneficial effects to a woman’s well-being, such as decreasing pre-menstrual symptoms.

In addition, lifestyle modifications to improve fertility are a cornerstone of the treatment. One example is to achieve appropriate weight, either by weight loss or gain, based on individual needs. NPT providers order specific supplements and vitamins in addition to a healthy diet. Furthermore, they assess sleeping habits, stress, and exercise and provide recommendations for modifications. Special diets, such as anti-inflammatory diets, are usually beneficial in many patients such as those with endometriosis (Hilgers, 2004).

**Surgical NaProTECHNOLOGY**

In treating infertility, laparoscopic and robotic surgeries are used, as they are minimally invasive with fewer adhesions and quicker recovery. NPT surgery is reconstructive surgery of the pelvis with the objective to restore normal function. Some common surgeries used in NPT include ovarian wedge re-section, removal of endometriosis, tubal reconstruction, removal of adhesions, and other anatomical procedures. A fellowship in NPT is necessary to become a certified NPT surgeon. This certification indicates training in the use of techniques with a lower incidence of adhesions and is specially targeted to improve natural fertility (Hilgers, 2004).

**Efficacy of NaProTECHNOLOGY compared to assisted reproductive technologies.**

As successful infertility treatment may affect marital satisfaction, it is important to note the success rates of both ART and NPT. One study examined 16 countries that had an IVF register that observed pregnancy rates for different forms of ART. Clinical pregnancy rates for IVF were
26.9% per aspiration (egg retrieval) and 30.3% per embryo transfer into the uterus. These rates for ICSI were 28.5% and 30.9%, respectively. The clinical pregnancy rate with IUI was 12.6% per insemination. Furthermore, with IVF and ICSI, the singleton delivery rate was 78.2%, while twins were 21.0%, and the rate of triplets was 0.8% (Andersen et al., 2009).

Although only 1.7% of all total births in the United States were a result of ART, the overall rate of twins conceived by ART was 34% and triplets or higher order was 1%. This incurs greater costs. The medical cost of a singleton delivery was an estimated $26,922 in 2013, whereas ART twins cost $115,238 and ART triplets or higher orders cost an average of $434,668. Infants born from ART have more frequently low birth weight (25.5%) and prematurity (31.2%) compared to all infants (8.1% and 9.7%, respectively). The estimated cost of pre-term birth is approximately $51,600 per infant in the United States, with a total estimated cost of over $1.3 billion annually for pre-term ART babies (Sunderam et al., 2018).

Regarding NPT patient demographics, Tham, Schliep, and Stanford (2012) found that in a group of 108 couples with infertility trying to conceive a pregnancy, the average age was 35.4 years with a mean of 3.2 years to trying to achieve pregnancy prior to starting NPT care. In Stanford, Parnell, and Boyle’s (2008) larger sample of 1,239 NPT couples, the average age was similar, being 35.8 years; however, the duration was 5.6 years in trying to achieve pregnancy. Boyle (2004) examined 95 couples who previously failed ART and found the average time to conceive was 6.1 years prior to starting NPT. After starting NPT, 45% of couples conceived within 6 months and only 11% of the couples conceived after more than 20 months (Boyle, 2004).

Success rates for NPT varied from study to study. For couples who completed 24 months of NPT treatment, the cumulative proportion for first live births was 52.8 of 100 couples, with a crude proportion of 25.5 (Stanford et al., 2008). In the Boyle (2004) study, the success rate for
NPT in couples who previously failed ART ranged from 38.4–81.8%, dependent on the underlying diagnosis. The total adjusted proportion during the course of four years was 26.2% in achieving pregnancy at 12 to 17 months and 32.6% at 18 to 25 months (Boyle, 2004). In women using NPT, the number of reported births, in his practice during the course of 6 years, amongst women who had previously failed ART, was 89 (Boyle, 2004). This amount includes births from subsequent pregnancies if the women became pregnant again throughout the course of the study.

The cumulative adjusted proportion of first live births for those completing up to 24 months of NPT treatment was 66 per 100 couples, and the crude proportion was 38%. The cumulative adjusted proportion of first conceptions was 73 per 100 couples, and the crude proportion was 47%. Of the 51 couples who conceived, 12 couples (24%) conceived with CrMS instruction alone, 35 (69%) conceived with CrMS and NPT medical treatment, and 4 (8%) conceived after additional surgical treatment (Tham et al., 2012).

Finally, it is important to note that the prevalence of multiple gestation pregnancies was relatively low in all studies examining NPT. There were only 4.6% twin births in one study (Stanford et al., 2008). In another study, all were singleton births (Tham et al., 2012). Furthermore, Tham’s study (2012) revealed a low pre-maturity rate with 73% born at 37 weeks’ gestation or later and 78% having a birth weight of 2500 grams or more.

However, caution must be taken in directly comparing ART to NPT treatment, as the methods and measurement of success are quite different. Efficacy of IVF is usually measured per cycle, whereas NPT is measured per woman success over a longer course of time, such as one or two years (Velez, 2012). When a treatment using ART is successful and a couple conceives, they are likely to continue to be infertile because the treatment did not heal the underlying causes. However, treatments with approaches such as NPT focus on identifying and treating the underlying causes in the endocrine, immune, and reproductive systems to restore natural
function. When successful, NPT helps treat the underlying cause of infertility, making subsequent pregnancies easier to achieve (Doroski, 2014).

**Treatment and Patient Preferences**

As with any medical treatment, it is imperative to consider patient preferences in contriving a plan of care. Some couples choose not to pursue ART treatment due to religious beliefs. Many religions recommend restrictions on what treatments are acceptable to use. The Islamic faith forbids the use of donor eggs or sperm and surrogacy (Atighetchi, 2000). Judaism forbids the use of donor sperm and the use of masturbation to collect sperm and has strict guidelines for donor eggs and surrogates (Schenker, 2008). The use of ART treatment is acceptable to both religions if these restrictions are met. NPT is compatible with any of these restrictions.

Catholicism advises against any treatments that substitute for marital intercourse, such as IVF, ICSI, and IUI. Therefore, this dissertation will focus on detailing Catholic teachings as NPT does not substitute marital intercourse and is the recommended option for Catholic couples. The Congregation for the Doctrine of Faith (2000) released an instructional document titled *Donum Vitae (The Gift of Life)*, which addresses infertility-related biomedical issues. This document states that scientific research and applications are an expression of the God-entrusted task of having dominion over the earth. However, it should never replace the Laws of God, in that children are not a right of marriage, implying ownership over the child. Children are the “supreme gift” for parents and are their own individual entities resulting from a free giving love of the parents (Congregation for the Doctrine of the Faith, 2000). Catholicism thus supports and encourages procedures which improve underlying disorders while cooperating with the conjugal sexual act but not replacing it. Destroying the unitive and procreative aspects of the marital act, even if only partially, contradicts the plan and will of God (Doroski, 2014).
Treatments such as IVF make human procreation impersonal, sterile, and an extra-bodily technical process, which makes it immoral in the eyes of Catholics (Mallia, 2012). NPT would be an appropriate treatment for couples with moral oppositions to ART approaches, which often minimize the act of marital intercourse, place embryonic persons in peril, and can result in the destruction or freezing of embryos (Jemelka, Parker, & Mirkes, 2013). As mentioned previously, there is a high volume of embryos produced with only approximately one-third transferred in IVF procedures; less than 13% of transferred embryos survive (HFEA, 2017). Couples face not only the loss of embryos in the transfer process, but also need to decide what to do with additional embryos that are not transferred. There may be additional costs with freezing and storing embryos and the couple must decide what to do once storage is complete. Additionally, legal issues have emerged regarding the freezing and storage of embryos with opposing views on whether to categorize embryos as persons, property, or in their own category. In addition, legal disputes surrounding the embryos have arisen in cases of divorce or death of a spouse (Yoshinda, 2017).

Studies find that fertility enhancing regimens and adoption had the highest acceptability among couples. Studies also reveal the least acceptance amongst couples for sperm, egg, embryo and donation and surrogate motherhood (Valsangkar, Bodhare, Bele, & Sai, 2011). One study found that 95% of Iranian, Muslim patients disagreed with sperm or ovum donation or were opposed to surrogacy, 22% agreed with embryo reduction, and 94.5% felt that ART expenses were not easily affordable (Sohrabvand & Jafarabadi, 2009).

Another patient preference may be the use of more natural and non-traditional approaches. Couples are seeking complementary and alternative medicine at increasing rates worldwide for one reason: dissatisfaction with conventional medicine (Bardaweel, Shehadeh, Suaifan, & Kilani, 2013). These couples may object to some of the components of IVF or other
ART treatments due to concerns with the use of artificial and chemical methods. Use of the Creighton Model charting system and bio-identical hormones are appealing to such couples as a more natural approach. Some of the lifestyle modifications of NPT appeal to this population as well.

Finally, cost may play a role in choosing a type of treatment. The average cost per patient with successful pregnancy may be $47,577.21 with IVF and up to $32,216.46 for NPT (Hilgers, 2004). Couples who pursue IVF treatment tend to have more financial means (Eisenberg et al., 2010). There are 15 states that mandate infertility coverage by insurance plans, with four of these states mandating coverage for at least four cycles of IVF. Three of these four states have ART rates that are more than 1.5 times the national average (Sunderam et al., 2018). Most insurance plans cover NPT as it falls under primary care services for women’s health issues, as treatment is focused on the underlying diagnosis, in turn improving fertility. The emphasis is to improve gynecologic health rather than only focusing on conception.

**Consequence of Infertility on a Marriage**

Couples who are in very stable or “high-quality” marriages have different ways to handle conflict than those in unstable marriages. These highly functional marriages exhibit problem solving skills that result in increased marital satisfaction. On the contrary, unstable marriages have dysfunctional interactions that lead to dissatisfaction. Effective coping skills protect the couple from distress and negative life events. High levels of marital satisfaction are a result of commitment, positive feelings for the spouse, affection, and interactions within the relationship. Low levels of marital satisfaction are a result of negative interactions (Dixon, Jenkins, Hawkins, & Sosin, 2014).

The effect of infertility on a relationship can be profound as infertile couples were found to be up to three times more likely to divorce, especially when the couple did not have children.
after infertility evaluation (Kjaer, Albieri, Jensen, Kjaer, Johansen, & Dalton, 2014). This is significant considering that an estimated 15–20% of divorced individuals have poor outcomes which can negatively affect health (Sbarra, Hasselmo, and Bourassa, 2015). Emotional stress is a common reason for couples to avoid pursuing infertility treatment and leads to higher levels of depression. Emotional stress is also the most common reason to discontinue treatment (Eisenberg et al., 2010). Furthermore, depression contributes to the rate of divorce (Sbarra et al., 2015). Providers must take this into account and provide couples with the necessary tools and resources to provide early and preventative intervention.

Both CrMS teachers and NPT providers provide continuous support to couples even if the outcome is not what is expected. If unable to conceive and carry a pregnancy, most providers can assist with the adoption process if desired by a couple. If a couple decides not to adopt, CrMS teachers and NPT providers may encourage them in other ways to fulfillment, such as participation in charitable acts. These include various aspects of volunteering and aiding disabled children (Hilgers, 2004).

Additionally, a standard component of CrMS and NPT is addressing the Spiritual, Physical, Intellectual, Communication and creativity, and Emotional domains (SPICE). An instructional book provided to couples includes a chapter on SPICE detailing each domain. The CrMS teacher assesses SPICE utilizing a standardized tool to help focus on the specific needs of each couple (Hilgers, 2004). Within the spiritual domain, teachers may guide couples to pray together or reflect on what it is that brings them hope or meaning. Regarding the physical domain, couples may be encouraged to increase physical affection such as hugging and hand holding. Physical activities such as exercise, household chores, and cooking together are also part of the physical domain. The intellectual domain includes respect for one another and learning new things together. To foster the communication domain, couples are encouraged to
discuss family planning goals with one another, improve listening to each other. The creativity domain includes writing love notes to each other, planning date nights, and doing unexpected acts of love such as buying flowers. Finally, the emotional domain includes being able to laugh or cry together and trusting each other with problems and feelings. Integration of SPICE during CrMS instructional sessions and NPT care is part of both the teacher and the NPT provider curriculum. Additionally, it is detailed in the CrMS teacher’s manual and the textbook *The Medical and Surgical Practice of NaProTECHNOLOGY* (Hilgers, 2004).

The assessment and support of SPICE within care empowers couples to collaboratively participate in their plan of care, which has the potential to increase and improve interactions and satisfaction. Unfortunately, there are no available published studies evaluating SPICE or its relation to marital satisfaction. This would be an ideal topic for future research studies.

**Significance to Nursing**

The emotional and psychological effects of marital dissatisfaction in themselves pertain to the field of nursing as holistic care demands the inclusion of care for the mind and relationships. Marital dissatisfaction also has physical health effects. Negative marital interactions are linked to cardiovascular disease when adjusting for behavioral factors (De Vogli, Chandola, & Marmot, 2007). One study found that marital distress was related to increased reports of elevated depression symptoms, decreased levels of work satisfaction, and lower satisfaction with overall health (Sandberg, Yorgason, Miller, & Hill, 2012).

Marital distress and dissatisfaction have also been linked to an increase in non-compliance to medical regimens, alcohol and drug use, poor eating habits, and inadequate sleep (Kiecolt-Glaser & Newton, 2001). This is important to infertility care as negative lifestyle practices can affect fertility. There is an overlap between unique environmental influences on
satisfaction and health in the most satisfying marriages. This means that the relationship may be protective against health problems in high-quality marriages (South & Kreuger, 2013).

In addition to affecting marital satisfaction, untreated infertility can have detrimental effects on lifelong health. Infertility is a symptom of chronic underlying conditions, which can have poor consequences for health beyond fertility. For example, women with infertility can have a higher risk of developing certain cancers, especially ovarian, breast, and endometrial cancers (Hilgers, 2004). Women diagnosed with endometriosis have a higher risk of ovarian cancer, breast cancer, melanoma, and non-Hodgkin’s lymphoma (Hilgers, 2004). In addition, 78% of women with endometriosis were diagnosed with hypothyroidism compared to 13% of women without endometriosis (Vatakencherry et al., 2016). Coronary artery disease was found to have a relative risk of at least 1.35 in women with endometriosis (Mu et al., 2016). Women with infertility also have a higher risk of osteoporosis, gastrointestinal problems, pelvic pain, dysmenorrhea, dyspareunia, and disfiguring hirsutism and a decreased quality of life related to specific symptoms (Hilgers, 2004).

The nursing profession has long used the holistic concept in education, standards of practice, literature, and policies and regulations. Florence Nightingale, who is known to have advanced nursing into a respectable profession, regarded healing as a component of holistic care and distinguished curing from healing. Curing focuses on the physical dimension of removing the signs and symptoms of a specific disease but may not actually remove distress or the disease itself. Healing, on the other hand, addresses the whole body, mind, and spirit of a person to find balance (O’Brien, King, & Gates, 2007). In the case of infertility, the nurse assists with the healing of the couple even if the couple is unable to have a biological child. Care must be provided to minimize marital distress and dissatisfaction to promote the overall well-being of the couple.
An excellent opportunity to provide holistic and health promoting care lies in family practice. According to the American Association of Nurse Practitioners (2015), over half of the nurse practitioner workforce works in family practice. The likelihood of a patient with infertility receiving care from a nurse practitioner is quite high, especially in the family practice office. Thus, many nurse practitioners will encounter infertility couples and, if prepared, can provide NPT treatments in a holistic manner. Because infertility clinics are highly regimented, it is unlikely that they will have an opportunity to provide care focusing on the well-being of a marital relationship.

**Purpose of the Present Study and Change in Practice**

The purpose of this study is to examine marital satisfaction scores in couples with infertility who are utilizing NPT. In addition, the current study will examine demographic variables to determine if there is an association to marital satisfaction scores. This is important as it helps describe the population utilizing NPT for infertility and any specific variables that are significant.

The research aims were to:

1. Evaluate the marital satisfaction levels in couples with infertility who are using NPT treatment.
2. Determine if there are differences in marital satisfaction scores between males and females within a couple.
3. Determine if there is an association between marital satisfaction and age, race, education level, employment status, financial strain, or religious affiliation.

A major benefit of conducting the current study is to evaluate evidence for the NPT approach to treating couples in a holistic manner. Various NPT providers individually and at conferences have stated they feel that couples are very satisfied as there is a focus on supporting
the relationship within the plan of care. One NPT center released questionnaire results with an overall 97.5% satisfaction rate in 2013. One statement by a patient was, “Everyone at NaPro genuinely cares about you as a couple and wants to find a solution to our infertility” (The Life FertilityCare Programmed Client Audit, 2013). However, there are no current studies that specifically look at how NPT affects marital satisfaction. Examining marital satisfaction levels is a good starting point to provide initial evidence to substantiate anecdotal claims.

The major objective of the current study was to describe the population of infertile couples utilizing NPT for infertility since there were no prior studies published on this matter. The current study may help stimulate subsequent studies further examining this subject and exploring causal relationships for various components of NPT treatment and marital satisfaction. Furthermore, these future studies can compare marital satisfaction in couples using NPT to those using other treatments to assess for any characteristics or results unique to NPT.

For demographic variables found to be associated with marital satisfaction, providers could utilize this information to recognize high-risk couples to improve infertility care. In addition, the results of the proposed study could be extrapolated to prospective studies. For example, if sharing the same religion is associated with higher levels of marital satisfaction, subsequent studies may focus on religion and NPT in greater detail.

**Study Questions**

The research questions for this study were:

1. Among couples receiving NPT treatment for infertility, what are the distributions of marital satisfaction scores for husbands and wives?
2. Among couples receiving NPT treatment for infertility, what are the differences in marital satisfaction scores between men and women within a couple?
3. Among couples receiving NPT treatment for infertility, is there an association
between marital satisfaction scores and the demographic variables of age, ethnicity, education, employment, income, financial strain, or religion?

**Definition of Key Terms/Variables**

The independent variables were the use of NPT and demographic variables. The dependent variable was the level of marital satisfaction using the Index of Marital Satisfaction as a research tool. Demographic variables for the current study included age, ethnicity, education, income, and employment, as these variables are often assessed in studies examining marital satisfaction (Zainah, Nasir, Hashim, & Yusof, 2012). In addition, financial strain was examined as it reflects the welfare and well-being state and is more associated with health than measuring income only (Shaw, Benzeval, & Popham, 2014). Chapter Two further details differences in sociodemographic effects on marital satisfaction.

**Conceptual Definitions**

Marital satisfaction was defined as the “mental state that reflects the perceived benefits and costs of marriage to a particular person” (Stone & Shackelford, 2007).

NPT was defined as a women’s health science with the ability to work cooperatively with a woman’s menstrual and fertility cycles. NPT treats underlying conditions that lead to infertility to restore natural fertility and utilizes the Creighton Model charting system to monitor cycles (Hilgers, 2004). Integration of SPICE into care is standard practice for CrMS teachers and NPT providers.

Financial strain was defined as the financial demands that are placed upon an income, which is more reflective of welfare (Shaw et al., 2014).

**Operational Definitions**

Marital satisfaction was defined as having a score below 30 on the Index of Marital Satisfaction.
The operational definition of NPT users consisted of clients who identify themselves as receiving NPT treatment.

Age was defined as the age in years that the subject had at the time of the study.

Race and ethnicity were defined as the self-reported racial and/or ethnic group as identified by an individual.

Education level was described as the highest level that is completed, represented as high school or less, some college, college, or post-graduate degree.

Income was defined as the total annual income for the household that is received on a regular basis before taxes or other deductions.

Financial strain was determined via the question on how people felt about their household income based on a study performed on financial strain and labor force status in relation to health. Possible answers were: “living comfortably on present income,” “coping on present income,” “finding it difficult on present income,” and “finding it very difficult on present income” (Shaw, et al., 2014).

Religious affiliation was described as the self-identified religion an individual practices. Based on the Pew Research Center, the major religious groups in the United States are Evangelical Protestant, Mainline Protestant, Historically Black Protestant, Catholic, Mormon, Orthodox Christian, Jehovah’s Witness, other Christian, Jewish, Muslim, Buddhist, Hindu, other religion, Atheist, Agnostic, nothing in particular, and “don’t know” (Smith et al., 2015).

Theoretical Framework

There are numerous behavioral theories that could be applied to families, coping, and health promotion, which all would pertain to infertility treatment. The VSA model by Karney and Bradbury, published in 1995, is based on behavioral theory where marital quality impacts and affects behavioral exchanges and reactions for overcoming difficulties. In addition, it
accounts for crisis theory in that stressors and difficulties directly influence the way spouses react and adapt, which can alleviate or sometimes exacerbate the stressors and difficulties. The VSA model incorporates attachment theory used to examine how personal characteristics and experiences contribute to stressful events and how well couples can adapt to them. All these characteristics and influences compose the different pathways (A, B, C, D, E, F, G, and H) which are depicted in Figure 1 (Karney & Bradbury, 1995).

Pathway A focuses on the stressful events and circumstances that have a profound impact on marriage and include the adaptive processes that are affected by stress. This means that stress can be external to a couple but influence the adaptation within the couple (Karney & Bradbury, 1995). An example of this would be a spouse having to fire an employee that he or she supervises, then returning home and arguing with his or her spouse over something that normally would be reconciled (or adapted).

Next, the enduring vulnerabilities a spouse possesses, which affect the ability of being able to adapt to stressful events, are illustrated in Pathway B. The experiences and traits a person possesses from their background are brought forth into the marriage, subsequently affecting adaptation. Thus, these traits and experiences have longitudinal effects on marital outcomes (Karney & Bradbury, 1995). An example is a spouse whose parents had an abusive marriage who may have certain attitudes manifested in their own marriage, such as decreased conflict resolution skills. Pathway C refers to the stressful events that result from the enduring vulnerabilities themselves, whereas Pathway D refers to the stressful events that occur by chance (Karney & Bradbury, 1995).

In Pathway E, stress events influence the adaptive processes of a couple. There is a cycle where stress affects the capacity to adapt to the stress, which contributes to the worsening of stress, which then continues to increase the challenges for adapting to stress and may even
become overwhelming. Adequate adaption, on the other hand, can help alleviate further stressors (Karney & Bradbury, 1995).

The adaptive process influences changes in marital satisfaction in Pathway F. The couple can learn to adapt to each other’s negative behavior by either avoiding it or overcoming it through their own interaction. Pathway G accounts for the variation that marital quality can account for marital behavior. Finally, Pathway H refers to the marital stability affected by marital quality in that decreased marital quality, resulting from repeated poor adaptation, leads to unstable marriages (Karney & Bradbury, 1995).

Overall, the model hypothesizes that marriages with less stressful events and fewer enduring vulnerabilities will have higher marital satisfaction and stability within the marriage. Couples who have more stress and many enduring vulnerabilities will have decreased marital quality and decreased stability, which can lead to separation and divorce. Other couples can fall between these dimensions. The relationship of any of the different pathways can depend on the strength and nature of stressors, enduring vulnerabilities, and adaption. A couple may still be able to adapt to a high level of stress if they have few vulnerabilities or vice versa. Overall, since enduring vulnerabilities are expected to stay relatively the same, stress in a satisfied marriage is expected to decrease marital quality while stress in an unsatisfied marriage is likely to end it (Karney & Bradbury, 1995).

The strength of the model lies in its ability to link broad levels of analysis, such as demographic variables, to some of the micro-level variables. In addition, it considers both change and stability in marital satisfaction. A major limitation of the model is that it attributes stability of the marriage to marital quality and fails to account for external factors that may influence stability, such as having a barrier in wanting to leave the marriage. The emphasis of the model is not to address divorce but rather to examine the factors that affect changes in marital
quality. Next, there is no distinction between acute versus chronic stress to determine if there is a difference. The exact relationship between stress and enduring vulnerabilities is unknown as the effects could be interactive, additive, or combinatorial.

The VSA model is used as the guiding framework for this study, since couples with infertility experience increased stressors resulting from infertility diagnosis and treatment (Eisenberg et al., 2010). Although enduring vulnerabilities cannot be changed during the course of treatment, positive adaptive processes can be encouraged. Through NPT, couples receive holistic care, which encourages both partners to work as a unified couple. By empowering and providing them some control with diagnosis and treatment, couples have more positive ways to adapt as they work together. For example, CrMS teachers encourage couples to chart the fertility cycle together so both know how the cycle appears and what phase of the cycle the woman is in. This is a positive adaptive process because couples can better support each other with treatments and timed intercourse. The model provides support in the current study’s aims since NPT and demographic variables may be related to marital satisfaction.

In addition to supporting the research aims, the model guided the literature review, as presented in Chapter Two. The literature review examined broad variables, such as demographics, and looked at specific characteristics that affect marital satisfaction, considered as enduring vulnerabilities. The second part of the literature review evaluated certain interventions or treatments as they are part of the adaptive process. In addition, adaptive processes included the characteristics that have the ability to be changed. The last component of the literature review examined infertility as it is a stressor to marital satisfaction.

**Summary**

Infertility is a prevalent condition for which currently the major treatment offered is ART. The most common ART treatment, IVF, incurs high costs for the procedure itself and often
results in multiple gestations, prematurity, and low birth weights. In addition, some couples have moral, religious, or personal objections to some of the ART procedures. NPT offers couples an alternative to ART where underlying conditions are diagnosed and treated to restore natural fertility. These treatments have similar or higher success rates as compared to ART and can help subsequent pregnancies become easier to achieve. NPT treatment is also more cost-effective and appears to have fewer adverse effects.

Martial satisfaction can be affected by infertility treatments, especially when couples have negative interactions. Marital dissatisfaction has been linked with decreased physical and mental health. In addition, decreased marital satisfaction can have a poor effect on lifestyle choices and compliance to healthcare. Infertile couples are at higher risk of having marital distress and dissatisfaction. The current study examined marital satisfaction in couples who were using NPT and which demographic variables were statistically correlated to marital satisfaction. The study provided new evidence as there were no available studies examining this specific phenomenon. In addition, it may serve as a framework for subsequent studies.

The theoretical framework for this study was the VSA model, as it focuses on the stress and adaptive processes, which can affect marital satisfaction and quality, which in turn affects marital stability. As NPT helps support a couple with coping, empowerment, and changing lifestyles, this is an ideal framework used to guide the research aims and literature review.
Chapter Two: The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility

The student researcher completed an integrative review of literature to assess the current state of science specific to marital satisfaction and infertility. The first component of the literature review was completed to support the theoretical framework and its applicability to the current study. The Vulnerability-Stress-Adaption (VSA) model, used in multiple studies, supports its theoretical underpinnings by providing evidence for the various pathways of the model. This includes the influence of enduring vulnerabilities, adaptation, and stress on the satisfaction and stability of the marriage. In addition, many of the studies examined marital satisfaction using the VSA model and found that it was a feasible theory to use. These studies further support the model’s use as the guiding framework for this study.

The second portion of the literature review was dedicated to the evaluation of the state of the science concerning marital satisfaction. The VSA model guided the literature review in that demographics and characteristics relating to marital satisfaction were considered vulnerabilities. Studies regarding intervention and treatment were considered adaptive processes. Finally, studies on infertility, considered a stressor, were evaluated and vulnerabilities and adaptation were included.

**Theoretical Literature**

A literature review was conducted by the student researcher evaluating the VSA model to find supporting evidence for its use in the current study. Initially, PubMed was searched for the theoretical literature but was found not to contain relevant research when the search terms “vulnerability stress adaptation model” and “VSA model” were utilized. The two databases utilized, which yielded positive results utilizing the same search terms, were CINHAL and PsychINFO. The only limitation encountered was the English language. CINHAL revealed four
results with three relevant to the subject matter. PsychINFO showed 29 results, but after excluding dissertations and irrelevant articles only 15 were ultimately included.

Each study was evaluated for the theoretical evidence. The study results corroborated the different domains of the model. Personality traits and experiences could predict stress and degree of relationship (Cohan & Bradbury, 1997; Knapp, Norton, & Sandberg, 2015; Langer, Lawrence, & Barry, 2008; Stith et al., 2011). The VSA model helped explain the variances in relationship distress within the model’s domains, taking into account backgrounds of the individuals being studied (South, Foli, & Lim, 2013; Stith et al., 2011). Furthermore, problem solving behavior learned from past experiences moderates the effects of life events, current situations and stressors (Cohan & Bradbury, 1997). The enduring vulnerabilities each partner brings into the marriage can influence how the couple responds to life events and stressors and how they use adaptive strategies to deal with them (Knapp et al., 2015).

In a couple, the partner’s vulnerability, adaptation, and stress risk factors can influence how the individuals experience changes in marital satisfaction across transitions (Don & Mickelson, 2014). Enduring vulnerabilities can predict individual differences brought into the marriage (Stroud, Durbin, Saigal, & Knobloch-Fedders, 2010). The consequences of enduring vulnerabilities and variables can predict intimate partner violence, and applying the VSA model can predict adverse relationship behaviors (Marshall, Jones, & Feinberg, 2011).

One study by Johnson, Galambos, and Krahn (2014) found that the slope of anger, which can be affected by stress, predicted relationship risk. This was the first long-term study with results supporting the VSA model. Negative affectivity, or neuroticism, is deemed an enduring vulnerability since it is thought to be a personality trait. Negative affectivity can decrease marital satisfaction and the enduring vulnerabilities that are brought into a marriage can improve or deteriorate the quality of the marriage over time (Hanzel & Segrin, 2009). Opportunities,
attitudes, behaviors, and relationships, influenced by social ecological contexts, such as education, can predict stability (Cutrona, Russell, Burzette, Wesner, & Bryant, 2011). Stress, affected by personality traits, predicted levels of physical aggression over time (Langer et al., 2008).

Religiosity was an important resource and promoted relationship stability (Cutrona et al., 2011). Married couples who have increased tendencies to forgive each other have higher levels of satisfaction. The VSA model is effective in trying to understand communication and forgiveness in married couples. The study found the VSA model less effective for couples who are dating, but the researchers felt that this could be a result of the fact that the VSA model was specifically designed for married couples (Sheldon, Gilchrist-Petty, & Lessley, 2014).

When multiple factors across the different domains of vulnerability, stress, and adaptation are considered, one can better understand the adaptive demands that arise. Data on the different domains of the VSA model have illustrated their combination and effects on adaptation (Trillingsgaard, Sommer, Lasgaard, & Elklit, 2014). Using the VSA model can offer explanations for why associations occur within the domains (Woszidlo & Segrin 2013). The VSA model can improve the efficacy of therapies by guiding and aiding in the development of various treatments. Healthcare providers need to develop and implement interventions with a focus on all the domains within the VSA model (Trillingsgaard, Baucom, & Heyman, 2014; Trillingsgaard, Sommer, Lasgaard, & Elklit, 2014). One example may be improving communication, as it may be an adaptive process (Hanzel & Segrin, 2009). In addition, researchers have supported the use of the VSA model in research examining marital relationships (Langer et al., 2008).

Strict VSA model utilization as a guiding framework for a study could pose a limitation when assessing the results of the study in that other factors outside the model may not be
considered (Stith et al., 2011). However, all the studies reviewed provided evidence or results that supported at least one domain of the VSA model, further supporting its use for the present study.

**Empiric Literature**

Utilizing the VSA model, the literature review focused on stress, enduring vulnerabilities, and adaptation in a marriage. The student researcher evaluated each study to determine if factors that affect marital satisfaction were present and how the VSA model explained these factors. In addition, treatment options relating to marital satisfaction were searched to review adaptation processes in couples. Finally, infertility and marital satisfaction were evaluated to determine the effects of stress on treatment options, which would be considered methods of adaptation.

Two databases were utilized in the literature review: CINAHL and PubMed. In CINAHL, search options were limited to English language, human subjects, peer-reviewed publications, evidence-based practice, and publication dates from January 2010 to March 2018. In PubMed, search filters were English language, human subjects, clinical trials, controlled clinical trials, observational studies, randomized control trials, validation studies, ages 19–44 years old per search filter range, and publication in the past 5 years. Search terms utilized were “marital satisfaction,” “marital dissatisfaction,” “marital distress,” “marital satisfaction AND health,” “marital satisfaction AND income,” “marital satisfaction AND religion,” “marital satisfaction AND gender,” “marital satisfaction AND age,” “marital satisfaction AND education,” “marital satisfaction AND intervention,” “marital satisfaction AND treatment,” and “marital satisfaction AND infertility.” Initially, a total of 114 articles were identified in CINAHL and 62 articles were found in PubMed. Resulting articles from the searches were examined for pertinency to the subject matter and the inclusion of at least 50% married subjects. Articles that discussed domestic or sexual abuse, genetics, parenting, and other types of satisfaction other than marital
were eliminated. Many of the same articles appeared within the results of the various search terms. After analysis of the search results, 45 articles were ultimately used in the literature review. The articles were separated into the categories of: characteristics of marital satisfaction, treatment related to marital satisfaction, and marital satisfaction in couples with infertility for further discussion.

**Characteristics of marital satisfaction**

**Enduring Vulnerabilities.** First, demographics of the studies assessing factors relating to marital satisfaction were analyzed, as often demographics are considered enduring vulnerabilities. In this group of studies, the average age of all subjects was 43 years with an age range of 28 years to 54 years. In studies classifying age amongst men and women, men were an average of 2 years older than women. The length of the relationship ranged from 6.5 to 31.2 years. Some studies reported a racial classification of subjects. A majority of subjects identified as Caucasian with percentages ranging from 57% to 98% (mean 86%) with the exception of one study in an African American population. In studies that listed religious affiliation, the majority in each study was Christian, ranging from 66% to 76%. Most couples reported having at least one child (87% to 96%) with an average of 2.25 to 2.6 children. Employment rates ranged from 56.2 to 97% with incomes reported as average or high, based on national income averages.

Financial stress had a negative impact on satisfaction (Archuleta, Britt, Tonn, & Grable, 2011). Low-income couples had less satisfaction than couples with higher income (Dakin & Wampler, 2008). Employment and higher income increased marital satisfaction (Amiri, Sadeqi, Hoseinpoor, & Khosravi, 2016; Zhang, Fan, & Yip, 2016). Education levels had a positive effect on marital satisfaction (Amiri et al., 2016; Zhang et al., 2016). Women with better earning jobs, but in low-income families, reported less marital satisfaction than those with more education in higher-income families (Zhang, Wa Law, Hu, Fan, & Yip, 2015).
From the literature reviewed, we conclude gender plays a major role in factors that affect marital satisfaction. Husbands’ behavior and interactions with their spouse had a significant effect on wives’ marital satisfaction scores (Bloch, Haase, & Levenson, 2014; Burleson & Denton, 2014). Women who were more avoidant (avoiding intimacy or attachment) than men had lower levels of marital satisfaction than men, possibly placing more weight on the relationship when measuring satisfaction. The same study found that men who had higher levels of avoidance reported higher levels of satisfaction (Heresi Milad, Rivera Ottenberger, & Huepe Artigas, 2014). Interestingly, other studies showed that among men, avoidance negatively affected marital satisfaction (Mondor, McDuff, Lussier, & Wright, 2011; Pedro, Ribeiro, & Shelton, 2015).

Men also reported more sexual dissatisfaction while women reported more sexual problems (Heresi et al., 2014). Both men and women reported sexual engagement as an influence on marital satisfaction, and women reported alcohol as a factor affecting levels of marital satisfaction (Miller et al., 2014). Women also felt that good family functioning plays a major role in their marital satisfaction levels (Pedro et al., 2015).

In distressed couples, there was a negative effect of attachment avoidance on marital satisfaction in both men and women. However, attachment anxiety in men negatively affected women (Mondor et al., 2011). Also, men reported lower levels of satisfaction when women had higher levels of neuroticism and displayed more primitive defenses. Women reported decreased satisfaction when men resort to primitive defenses for coping with stress. These primitive defenses resulted in maladaptive coping mechanisms, such as denial (Verreault, Sabourin, Lussier, Normandin, & Clarkin, 2013).

**Adaptation and stressors.** Studies related to adaptive processes and stressors that affect marital satisfaction revealed that higher-quality communication can improve marital satisfaction
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(Burleson & Denton, 2014; Carroll, Hill, Yorgason, Larson, & Sandbeg, 2013). Involvement in a faith community can have a positive effect on marriage (Olson, Marshall, Goddard, & Schramm, 2015). The faith teaching of forgiveness resulted in increased satisfaction (Olson et al., 2015; Prabu & Stafford, 2015). Other factors that increased satisfaction were sacrifice, spiritual well-being, and humility. Empathy and commitment were significantly related to marital satisfaction (Olson, Marshall, Goddard, & Schramm, 2016). Those who reported higher levels of religiosity had higher levels of marital satisfaction (Archuleta et al., 2011). Church attendance and active participation in religious and faith communities had a positive effect on satisfaction (Litcher & Carmalt, 2009; Olson et al., 2015). Women reported higher levels of a relationship with God than men (Prabu & Stafford, 2015). Marital satisfaction was the highest when a couple shared the same faith (Olson et al., 2015; Olson et al., 2016; Prabu & Stafford, 2015).

Couples experiencing significant health issues are in distress, which can also affect marital satisfaction. Contentment and communication were influenced by the value and self-worth in providing care and tend to be affected by the intensity of caregiver activity (Jiang et al., 2013). Hope in the patient and optimism in the couple had a positive effect on marital satisfaction. As expected, stress had a negative effect on marriages (Jiang et al., 2015). Higher marital satisfaction levels appeared to decrease attachment avoidance in the presence of high levels of anxiety (Benson, Sevier, & Christensen, 2013).

Stress has an overall negative effect on marital satisfaction. However, support in the family had positive effects whereas outside support could have negative effects (Jiang et al., 2015). Better marital satisfaction in both men and women was associated with stronger family support. However, men who did not spend much time helping friends had higher satisfied relationships, which could be a result of spending more time with their spouse rather than friends. Women who reported less negative interaction with family experienced more marital
satisfaction (St. Vil, 2015). Having family support may improve a couple’s adaptive processes when dealing with stressful situations.

Patient hope had a positive effect on marital satisfaction. Patient and partner optimism also increased satisfaction; however, the greatest marital satisfaction was observed when the partner’s optimism was higher than that of the patient (Rock, Steiner, Rand, & Bigatti, 2014).

Finally, other commonly reported issues concerning marital conflict were related to money and children. This was found in a study of Brazilian couples and these same factors were similarly reported in United States couples. Both men and women reported overall sexuality as an influence on marital satisfaction, and women reported increased alcohol use as a major factor influencing decreased marital satisfaction (Miller et al., 2014).

**Treatment and Marital Satisfaction**

Studies relating to treatment were first assessed for demographics, as they typically cannot be changed. The average age in these studies was 32 years, with men being approximately 2 years older than women. The length of the marriage ranged from 5 to 16 years for all studies that reported this variable. The majority of subjects were Caucasian with percentages ranging from 65% to 95%.

There were multiple levels of education, support, and treatment that could affect the couple’s ability to adapt within their marriage. One study examining couples who received pre-marital relationship education found that with an increasing number of hours of education, couples showed slower declines in marital satisfaction. However, this may not prevent deterioration in marital quality over time (Cobb & Sullivan, 2015). Couples who used an online program teaching relationship skills had higher satisfaction levels over time (Kalinka, Fincham, & Hirsch, 2012). Other educational interventions found beneficial included using pamphlets and short messages on mobile phones (SMS) regarding pre-menstrual syndrome, which in turn
increased men’s knowledge and practices regarding pre-menstrual syndrome to improve marital satisfaction in both men and women (Morowatisharifabad, Karimianakolaki, Bokaie, Fallahzadeh, & Gerayllo, 2014).

Marital satisfaction was improved in partners who received various types of couples’ therapy (Cohen, O'Leary, & Foran, 2010; Baucom, Sevier, Eldridge, Doss, & Christensen, 2011; Dalgleish et al., 2015; Nooripour, Bass, & Apshe, 2013; Sher et al., 2014). However, there were different techniques used in therapy. One technique was integrative behavioral couple therapy, which helped maintain better communication (Baucom et al., 2011). Another therapy included the topics of communication skills training, motivation discussions, relationship issues, and health behavior topics (Sher et al., 2014). Some therapy focused on the quality of life related to marital satisfaction (Nooripour et al., 2013). Finally, emotionally focused couple therapy, which uses attachment theory to understand the needs and emotions of romantic partners, showed significant improvements in marital satisfaction (Dalgleish et al., 2015). Interestingly, demographic variables did not affect the treatment response (Dalgleish et al., 2015).

Some gender difference arose in response to receiving therapy. The rise in marital satisfaction in women was higher than in men among those participating in therapy (Cohen et al., 2010). Levels of problem solving and changes in wives’ positivity affected long term relationship outcomes. Satisfaction in husbands improved with positive changes in communication (Baucom et al., 2011). Men responded well to a parenthood transition program with increased relationship satisfaction and mindfulness, but there were not significant similar effects for women (Gambrel & Piercy, 2015).

Marital Satisfaction and Infertility

Infertility-related stress increased both overall emotional and marital distress (Gana & Jakubowska, 2016). Notably, some studies did not find a significant change in marital
satisfaction with infertility; however, these studies were conducted on women only (Ferreira, Antunes, Duarte, & Chaves, 2015; Amiri et al., 2016). One of these studies did note that when women had better coping with infertility, levels of marital satisfaction were higher (Ferreira et al., 2015). Adaptation to stress is essential to the well-being of the couple. Eight studies were analyzed and assessed utilizing the VSA model to assess the presence of enduring vulnerabilities and adaption in the presence of infertility.

**Enduring vulnerabilities and factors affecting marital satisfaction.** Some enduring vulnerabilities may exist within the couple that affect marital satisfaction. Couples with higher education level and shorter duration of infertility reported higher levels of marital satisfaction (Keramat, Masoumi, Mousavi, Poorolajal, Shobeiri, & Hazavehie, 2014; Gardi, 2014). Additionally, couples with higher income, shorter duration of marriage, no history of previous infertility treatment, and no male etiology of infertility reported increased levels of marital satisfaction (Keramat et al., 2014). Demographic variables associated with increased satisfaction after receiving cognitive behavioral therapy were couples aged 19–25 years, unemployed women, unknown etiology of infertility, and having decreased or no stress levels (Gardi, 2014).

There are gender differences in factors that affect marital satisfaction in couples with infertility. In women with subfertility, communication and the quality of the relationship affected their emotional status (Gourounti, Lykeridou, & Vaslamatzis, 2012). Interestingly, more women than men felt that childlessness had brought them closer and that the childlessness had strengthened their relationship (Schmidt, Holstein, Christensen, & Boivin, 2005). A good marital relationship had a positive effect on happiness in women, which in turn affected mental health in both men and women (Forooshany, Yazdkhasti, Hajataghaie, & Esfahani, 2014).

Marital satisfaction, social support, and self-esteem affect the quality of life in a couple (Keramat et al., 2014). Couples with infertility had lower quality of life scores as compared to
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fertile couples (Masoumi, Garousian, Khani, Oliaei, & Shayan, 2016). A higher quality of life as measured with the Fertility Quality of Life Relational scale was associated with marital satisfaction. There were no gender differences specific in the relational scale, but men had a higher quality of life level in general, and they may help their wives adjust to infertility-related stress (Donarelli et al., 2016).

Psychological distress negatively impacts marital adjustment and social support (Qadir, Khalid, & Medhin, 2015). High marital stress and poor communication between spouses increased anxiety (Gourounti et al., 2012). Predisposing mental health conditions are a vulnerability within the VSA model, as they affect adaptation.

Factors and Treatment that Improve Adaptation. Infertility poses stressors that challenge a couple to find means of adaptation. The way a couple adapts to the stressors is affected by multiple factors, some of which benefit marital satisfaction. One of these factors was communication, a common variable that improved marital satisfaction. Communication increased marital satisfaction, which in turn decreases marital stress, anxiety, and depression (Gourounti et al., 2012). In men, coping strategies and communication improved marital benefit, especially if they had not achieved pregnancy within a year (Schmidt et al., 2005). Additionally, couples benefited from support from each other, as discussing infertility with others can be difficult (Gourounti et al., 2012).

A variety of types of counseling can improve marital satisfaction in couples with infertility (Gardi, 2014; Kharde, Pattad, & Bhopal, 2012; Vizheh, Pakgohar, Babaei, & Ramezanzadeh, 2013). Specifically, cognitive behavioral therapy and supportive psychotherapy had benefits to marital satisfaction (Gardi, 2014; Solati, Ja'Farzadeh, & Hasanpour-Dehkordi, 2016). Mindfulness-based cognitive group therapy improved marital satisfaction and mental health in women with infertility (Shargh et al., 2016). One study examining therapy in women
found that the woman’s support system should be evaluated and that including the husband and family was beneficial (Qadir et al., 2015). The Fertility Problem Inventory was an effective tool to assess distress and difficulties that couples with infertility may face. This tool should be used as an early assessment of infertility-related stress to be able to help guide counseling (Donarelli et al., 2015).

One study examined marital satisfaction in couples who achieved pregnancy with a history of infertility compared to those who achieved pregnancy spontaneously. It found that couples reported increases in marital satisfaction from pregnancy to the post-partum period. Men who reported being more depressed during pregnancy had lower marital satisfaction post-partum. The study reported that couples who achieved pregnancy via ART were more susceptible to depressive symptoms in pregnancy and lower levels of marital congruence post-partum. Furthermore, this affected the couple’s ability to cope with stress. The authors of the study theorize that the lower levels of marital congruence in couples who used ART was due to both an increased vulnerability to depression and a difference in the skills needed to transition to parenthood versus the skills needed to cope with infertility (Gameiro, Moura-Ramos, Canavarro, Santos, & Dattilio, 2011).

Summary

The literature review of studies inclusive of the VSA model indicated that the framework is supportable and well founded for its use to evaluate marital satisfaction. One limitation that can arise in utilizing the model to conduct research is that it confines the explanation of the results to the model rather than further exploring other models or theories. By doing so, it may not identify other explanations for the results that may not fit within the constituents of vulnerability, stress, or adaptation. However, in general, the VSA model offers a comprehensive evaluation of marital relationships.
Chapter Three: The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility

The methodology of the present study is a descriptive, cross-sectional design. The sample included married couples with infertility who are English speaking and using NaProTECHNOLOGY (NPT) treatment. Participants completed demographic and marital satisfaction questionnaires that were analyzed utilizing appropriate statistical tests and models including the univariate, paired t-tests, and the linear mixed effects model. The student researcher presents detailed information on the methodology in this chapter. This includes information on sample recruitment, protection of human subjects, implementation, data analysis, and data protection.

**Study Design**

The current study followed a descriptive, cross-sectional design examining correlations and differences within marital satisfaction scores in couples along with demographic factors. This design was appropriate as it describes a phenomenon and a relationship at one fixed point of time (Polit & Beck, 2012). In this case, the phenomenon is marital satisfaction in couples with infertility using NPT. The relationships examined are marital satisfaction scores and demographic variables, utilizing the VSA model as the guiding framework for the study. This design is appropriate for this study because little research exists on the use of NPT therapy and marital satisfaction. Thus, before more complex studies can be tailored, one must first describe the phenomenon of marital satisfaction in this specific population.

Demographic variables including age, ethnicity, education, income, and employment were examined, as these are commonly assessed in marital satisfaction studies (Zainah, Nasir, Ruzy, & Yusof, 2012). In addition, financial strain was examined as it reflects the welfare state and it is more associated with health than income only (Shaw, Benzeval, & Popham, 2014).
Financial strain is determined via the question on how people feel about their household income based on a study performed on financial strain and labor force status relation to health. Possible answers are: “living comfortably on present income,” “coping on present income,” “finding it difficult on present income,” and “finding it very difficult on present income” (Shaw et al., 2014).

Notably, the term “marital interaction” was used in the questionnaire in place of “marital satisfaction” as to avoid potential bias in responses. The term “marital interaction” is a neutral term whereas “marital satisfaction” has a positive connotation. Participants may feel pressured to answer questions differently whereas using a neutral term may lead to more candid responses (Houser, 2016).

**Sampling Plan**

**Sample Size and Power Analysis**

To determine the target sample size with a power of 80%, the student researcher utilized a sample size calculator from Statistical Decision Tree (2017). For paired sample t-tests, the target sample size was 34 couples to reach a medium effect size of 0.5. For correlation, utilizing 0.3 for medium effect size determined a target sample size of 85 couples. Finally, for analysis of variance (ANOVA) testing, the target sample size was 53 couples for a 0.25 effect size. A significance level of 0.05 was used in all calculations. Therefore, the target sample size was 95 couples to accommodate all study questions in addition to accounting for attrition for missing data in the IMS tool, as those questionnaires were excluded from data analysis.

Because there were no published data concerning the population of infertility patients using NPT, the author of this proposal conducted an online survey of NPT providers across the United States by emailing a request to complete an online survey to providers who had listed email contact information on the FertilityCare Centers of America (2016) directory and the NPT
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Google Maps (2017) directory for the United States. Out of 64 invitations to participate, 22 providers responded to the question:

Specifically regarding NaProTECHNOLOGY, during the busiest time in the past two years, approximately how many active infertility patients were you caring for at that time? Please note that this information will be used to extrapolate the prevalence of couples using NaPro for infertility from the total of 1.5 million couples with infertility. This will be used for research purposes and your answers will remain anonymous. Please base answers on individual provider. Thank you!

All responses were anonymous and email addresses were protected using the blind carbon copy option with the student researcher’s email address in the “to” section. The survey was closed after 10 days and resulted in a total of 22 responses. The mean number of patients reported was 36.27, with a range of 0 to 250, mode 10, and median 20. Half of the responses were equal to or less than 20 with only two results over 100. This broad range is possibly a result that some NPT practices are in rural areas while others in large cities. In addition, NPT to also used for other types of women’s health issues outside of infertility, which may explain why some NPT providers stated they have zero or few infertility patients. Based on the responses, it was estimated that the total population of couples using NPT for infertility in the United States is approximately 7,834 patients. This number is based on multiplying the mean number of patients by total providers (36.27 × 216). It is important to note that this number is not a precise representation of the population using NPT for infertility across the United States, but is the best estimate available since there are no documented statistics regarding this specific population. The purpose of obtaining this estimate was to determine feasibility of reaching target sample size and planning study recruitment strategies.
Target Population

The target population for this study was married couples who were diagnosed with infertility and using NPT. The requirements for infertility diagnosis were that the couple must have been unsuccessful at trying to conceive a pregnancy or unable to carry the pregnancy to live birth for a minimum of one year. Inclusion criteria were couples who were legally married, English speaking, 18 years and older, considered to have infertility, and using NPT. Exclusion criteria, therefore, were non-English speaking, not legally married, no prior history of infertility, or not having used NPT services.

To determine recruitment sites, the student researcher sent an email to 26 family practice providers whose contact email addresses were listed on the FertilityCare Centers of America (2016) directory requesting recruitment flyers to be placed in waiting areas and/or examination rooms. Out of the 26 emails, there were 12 family practice NPT providers who responded and agreed to have flyers mailed to their offices. There is a risk for potential bias in this approach as a provider may have responded to the email based on his or her perception of couples within the practice and concern of how this information was to be represented.

As the response rate was low in the first 5 weeks of study implementation, the student researcher extended recruitment sites to include CrMS instructors and obstetrics and gynecology clinics. There were 42 additional instructors and providers that responded and agreed to have flyers sent to their offices, for a total of 54 recruitment sites for 27 various states nationwide (Table 1).

The flyers contained information on the study topic, inclusion criteria, and information on how to join the study (Appendix B). This recruitment strategy may pose a risk for bias in that couples who are more optimistic about their relationship may be more likely to agree to participate, while those who may be unsatisfied in their relationship may avoid wanting to
partake in a study that may force them to evaluate their marital satisfaction. However, due to logistical obstacles, as practices were widely distributed, this strategy was deemed suitable.

**Protection of Human Subjects**

Protection of human subjects is essential in ethical research. In this study, there are several potential ethical concerns. The first potential ethical dilemma this study poses is that the providers were aware that study participants were recruited through their offices. They can potentially modify treatment in the aspect of incorporating more marital support into treatment. However, since this was a cross-sectional study, it is unlikely that had much effect given the short duration of recruitment. Another potential ethical dilemma is that by examining marital satisfaction levels, couples may be forced to dwell on negative aspects of their marriage, which they may have avoided. Infertility can be a vulnerable issue for a couple and may affect how the couple responds to the questions being asked. To address these issues, full disclosure was made describing the nature of the study, the responsibilities of the researcher, the risks and benefits, and the right to refuse participation. Treatment was provided to each couple as usual and the couple was asked to complete a one-time individual demographic survey and the IMS tool. The major difference in partaking in the study versus refusal to partake is the completion of the demographic survey and IMS tool. There are no other additional tasks or changes that a couple needed to complete to participate. If a couple refused to participate or complete the study, there were no consequences or changes in care.

Informed consent was implied if study materials are returned. An information sheet was provided to each participant which included participant status, study goals, types of data, procedures, nature of commitment, participant selection, potential risks and benefits, alternatives, compensation, confidentiality, voluntary consent, right to withdraw or withhold information, and contact information (Appendix C). Confidentiality procedures included that study packet return
envelopes had the researcher’s address pre-printed in both the “to” and the “from” section, so that the sender remained anonymous. If a participant lists a name on the questionnaires, it was blacked out using an identity theft stamp. Research participants had the option of completing a separate questions and comments survey where any questions or complaints could be submitted to the student researcher (Appendix D).

**Instruments**

First, a demographic survey was administered to provide basic demographic information and information on the infertility history. Demographic data included age, gender, marital status, religion, education, annual income range, financial strain, and employment status. These questions were based on the literature review and the variables that were assessed in previous studies. All the demographic questions were provided a multiple-choice format with the exception of age, which was open-ended. The responses were analyzed to determine what types of demographic data affect marital satisfaction. The results were then evaluated by gender as the results of the literature review indicated that gender can pose significant differences on certain variables.

To measure marital satisfaction, the current study utilized the Index of Marital Satisfaction (IMS) tool as developed by Walter Hudson (Hudson & Glisson, 1976). It is a 25-question Likert-like scale where both members of a couple individually assign a number to each statement, which corresponds to none of the time (1), very rarely (2), a little of the time (3), some of the time (4), a good part of the time (5), most of the time (6), and all of the time (7). In scoring the answers, each positive statement is reversely scored, meaning that a score of one becomes a five and a score of five becomes a one. Negative statements are not changed or re-scored. Next, all scores are added together and a constant of 25 is subtracted to obtain the final score, which can range from 0 to 100. A score of less than 30 indicates marital satisfaction while scores that
are higher indicate levels of dissatisfaction. The higher the score is, the higher the level of marital dissatisfaction (Hudson & Glisson, 1976). Completion of the IMS takes an estimated 5 minutes (Hudson & Glisson, 1976).

Previous studies examined reliability of the tool using two split-half estimates. In addition, a test-re-test method was used where the total score of the first IMS was correlated to the total score on the second administration. The observed reliability of this method was 0.966. Furthermore, it was found that the standard of error of the mean was 2.912, so the “true” IMS score would fall within plus or minus six points 95 percent of the time (Hudson & Glisson, 1976). A second study found reliability for the IMS to be an alpha of 0.954 (Cheung & Hudson, 1982). Cronbach’s alpha was performed for this study to measure internal consistency.

Validity was measured using the data from the test and re-test analysis. The Locke–Wallace Marital Adjustment Test was used as the measure to predict IMS concurrent validity. The test was chosen because it has been extensively studied for validity and reliability. Correlations were examined of both scales in the test and re-test data to assess reliabilities and concurrent validities. Reliability in the IMS was 0.952 and 0.879 for the Locke–Wallace test. Concurrent validity coefficients ranged from −0.741 to −0.806 (mean −0.779), indicating that the scores exceed typical concurrent validity coefficients of 0.40 to 0.60 (Hudson & Glisson, 1976). A second study by Cheung and Hudson (1982) found discriminant validity was 0.825 for the IMS.

For the present study, the IMSs were scored utilizing the WALMYR Assessment Scale Scoring Program (WASSP). This program was purchased through WALMYR, which is the publisher of the IMS. The WASSP was in electronic format, and all responses from each individual IMS were entered twice to ensure accuracy. The WASSP calculated the final score for each questionnaire. This provided more accurate scoring as some questions on the IMS are
reversely scored, increasing the possibility of error if scored by hand. The IMS tool was chosen as it pertains to all aspects of the theoretical framework. The majority of the questions are founded on how a member of the couple expresses emotion, engagement, and conflict resolution which pertain to all aspects of the VSA model-enduring vulnerabilities, stressors, and adaptation.

**Procedure**

First, the University of Connecticut’s institutional review board’s (IRB) approval was obtained prior to starting the study (Appendix E). The recruitment sites do not require individual IRB approval. Once approval was obtained, eligible subjects were identified through inclusion and exclusion criteria. As noted previously, inclusion criteria were couples who are legally married, 18 years and older, English speaking, considered to have infertility, and using NPT. Exclusion criteria were non-English speaking, not legally married, not having a prior history of infertility, or not having used NPT services.

The student researcher distributed recruitment flyers to consenting facilities that provide NPT services. These flyers contained contact information on participation in the study, including email and telephone contact information of the student researcher. When a potential subject emailed an inquiry, the student researcher sent a response email within 72 hours, which included a list of inclusion criteria, brief information regarding the study, and a statement that the study is voluntary. For those who contacted via telephone, the student researcher provided the same information in verbal format (Appendix F). If the subject was interested in participating, a mailing address was requested to send out the study packet. The survey and tool packet consisted of an instruction page, the demographic survey, the IMS, the comments questionnaire, and two pre-paid postage envelopes (Appendices C, D, G, and H). One envelope was included to return the IMS and demographic questionnaires and the second was included to return the optional questions and comments survey. When putting together the study packets, each set of
questionnaires was numbered, starting at 100, with the corresponding spouse’s survey starting at 200 to allow matching a couple’s responses. A $5 Amazon gift card was provided for each participant ($10 per couple) and placed in the study packet as gratuity for time and participation. It would have been difficult to protect anonymity if subjects had had to provide personal information to receive the gift card.

The goal of the study was to examine couples; therefore, both spouses were required to complete the study. The recruitment flyers and all material stated that the study target population consisted of couples and that both members in the couples needed to participate. Any couple with questionnaires completed by one spouse only was excluded from the study. This was noted on initial inquiry for study participation as well as noted on the instruction page.

Initially, recruitment of couples was to take place over a period of eight weeks from the time of flyer distribution. However, as the response rate was low (less than 95 couples), the recruitment time was extended another four weeks.

After four weeks of recruitment, the response rate was low and recruitment was expanded to include other NPT providers and instructors of the Creighton Model. Utilizing the FertilityCare Centers of America (2016) directory, 382 emails were sent; the student researcher received 42 responses from couples who agreed to have flyers sent to them. To further increase the response rate, recruitment sites were informed they could email flyers to patients. With each amendment to the recruitment strategy, IRB was notified for approval. The total amount of recruitment sites was 54, located across the United States.

From the time of first contact, each subject had two weeks to complete the questionnaires. The two-week response time was chosen to allow adequate time for response and mail transit time and was noted on the information page. Consent was implied if the subject completed and returned the questionnaire. The survey packet included a separate form for
comments and questions to be mailed back in a separate return envelope. The research subjects had the option to include contact information on this survey or remain anonymous. If the subject chose to include contact information, the subject was then contacted within two weeks of receiving the survey to address any questions or concerns. The student researcher documented information from this survey in a Word document without any identifying data. The information was to be utilized in Chapter Five, which is the discussion portion of the study.

Other than the student and faculty researchers, there was no additional staff collecting data or contacting subjects. Equipment consisted of the computer used by the student researcher. Major costs associated with the study were the purchase of the IMS tool, data analytic software, shipping materials and postage, and gift cards. The student researcher covered all costs associated with this study.

**Treatment of Data**

Data were managed utilizing the Microsoft Excel for Mac, Version 15.28, released in 2016. The IBM Statistical Package for the Social Science (SPSS), Version 25, was utilized for data input and analysis. A list of participant contact information was maintained on a password-protected Microsoft Excel document. The file was stored on a USB flash drive purchased for this study and only contained the contact information file as to impede association to the study if a data breach should occur. Electronic data, including data obtained from the paper questionnaires and comment surveys, were kept on a Mac computer, which had password protection, anti-virus protection, and firewall protection. A backup to the data was saved onto a separate USB flash drive purchased specifically for the study, which was password-protected and kept in a locked cabinet. Any paper data were secured in the same locked cabinet as the two flash drives. Only the student researcher had access to this cabinet, which was located in a secured, locked office at the student researcher’s residence. Other than the contact information list, all electronic data did
not contain any identifying information. The student researcher and the university’s statistician were the only individuals with access to the data. After a period of three years, the list of contact information will be deleted from the USB drive.

Fidelity of the study protocol was maintained through the uniformity of the questionnaires and the same procedure used for each subject. An electronic code book was developed by the student researcher for each possible answer to the questionnaires and was maintained on the Mac computer. Any missing data in the demographic survey were classified as “unanswered” in the data analysis. If there were any unanswered questions on the IMS, the survey was disqualified from data analysis. This was because the maximum score for each question was 5 points, which could potentially affect whether the totaled score indicates marital satisfaction or dissatisfaction.

**Analyses**

All data came from the demographic survey and IMS as gathered using a paper format. Data analysis was based on each research question as listed below. A statistician from the student researcher’s university assisted with testing and analysis.

**Research Question #1:** In married couples with infertility utilizing NPT: What are the distributions of marital satisfaction scores for husbands and wives?

The first research question, regarding the distributions of marital satisfaction scores for husbands and wives, was answered using univariate analyses based on graphical techniques and calculations of descriptive statistics. Separate histograms were created for IMS scores of husbands and wives. Graphical characteristics of each histogram were quantified by calculating measures of central tendency (mean, median, mode), measures of dispersion (standard deviation, minimum, maximum), and measures of shape (skewness, kurtosis). Standard errors and 95% confidence intervals for the mean value of IMS in the husband and wife sub-samples were
determined.

Research Question #2: In married couples with infertility utilizing NPT: What are the differences in marital satisfaction scores between men and women within a couple?

The second research question, regarding the differences in marital satisfaction scores between men and women within a couple, was initially addressed by creating a scatter plot with IMS scores for females on the y-axis and scores for males on the x-axis. The Pearson correlation coefficient (r) was calculated to quantify the direction and magnitude of the linear trend between husbands’ and wives’ scores. Next, each wife’s score was subtracted from the husband’s score and plotted on a histogram in order to characterize the distribution of differences in IMS scores within couples. Assumption of data normality using a bell curve and the Shapiro–Wilk test assessed the distribution of values (Polit & Beck, 2012). A paired t-test was performed to evaluate whether there is significant evidence that wives’ IMS scores consistently differ (being higher or lower) from husbands’ scores. Next, responses to individual IMS items were analyzed using a series of paired t-tests to determine if there were systematic differences for any individual items between husbands and wives. These tests for “paired data” are appropriate as the scores for wives and husbands cannot be expected to be “independent.”

Research Question #3: In married couples with infertility utilizing NPT: What is the relationship between marital satisfaction scores and the demographic variables of age, ethnicity, education, employment, income, financial strain, and religion?

The third research question pertaining to the relationship between marital satisfaction scores with the demographic variables of age, ethnicity, education, employment, income, financial strain, and religion, was answered using ANOVA. This modeling technique was appropriate to describe the relationship between the dependent variable and scale or categorical data (Pinheiro & Bates, 2004). The relationship between IMS score and each demographic
variable was assessed individually.

**Summary**

The current study’s overall design was cross-sectional, utilizing a demographic questionnaire and the IMS tool to gather data for analysis. Careful attention was provided to properly recruit the targeted 95 couples based on inclusion and exclusion criteria as well as protecting each subject through confidentiality procedures allowing for anonymity. Data were collected in a uniform manner utilizing the study packets as described. To address marital satisfaction in couples with infertility using NPT, data were analyzed using paired t-tests. In identifying which demographic values may affect marital satisfaction, ANOVA was used. Data obtained from this study may be utilized to determine the effects of NPT on marital satisfaction as well as serve as a basis for future studies.
Chapter Four: The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility

The aim for this descriptive study was to examine marital satisfaction in couples with infertility who are using NaProTechnology (NPT). The results from the Index of Marital Satisfaction (IMS) and the demographic surveys are presented in this chapter. Analysis of each research question was completed. Among the initial 44 couples recruited from the 54 NPT and FertilityCare Centers across the United States, there were 40 couples who qualified for the study. There were 36 couples who returned the questionnaires. There was an additional individual who returned the demographic and IMS questionnaires, but was excluded as one spouse did not return his questionnaires. The final number of participants was 36 couples (n = 36). Data were collected from February 12, 2018 to May 20, 2018, with the last questionnaire received on May 20, 2018.

All data were analyzed using IBM SPSS Statistics, Version 25, designed for Mac computers. An alpha value of 0.05 was utilized for all statistical tests to determine statistical significance. In evaluating marital satisfaction, each couple was assigned an identifier code to allow for matching IMS scores between spouses. The purpose of collecting these data was to utilize them for descriptive statistics to answer the research questions on the distributions of marital satisfaction scores for husbands and wives as well as examine any differences between spouses (Research Questions #1 and #2). Raw data from the IMS scores were noted in Table 2. Data from the demographic surveys were analyzed to help examine the third research question, regarding the relationship between demographic variables and IMS scores.

Description of Sample

The sample consisted of 36 males and 36 females for a total of 36 couples. Demographic characteristics are described in Table 3. Mean ages were similar for men (x = 34.67) and women (x = 33.31). Both men and women were highly educated with 83.3% of men and 86.1% women
having at least a bachelor degree. Men had higher rates of full-time employment (91.7%) compared to women (41.7%), although 75% women were employed at least part-time. An annual household income of $75,000 or more was reported by 72.4% of the men and 75% of the women. Men and women both reported living comfortably on their present income (88.9% for men; 94.4% for women). The majority of the population was reported as White (86.1% men, 80.6% women). Finally, Catholicism was noted to be in the most practiced religion by both men (75%) and women (83.3%).

**Analysis of Research Questions**

Analysis of each research question was completed with the assistance of the university statistician with results as noted.

Research Question #1: In married couples with infertility utilizing NPT: What are the distributions of marital satisfaction scores for husbands and wives?

Marital satisfaction was defined as revealing an IMS score below 30 (range 0-100).

Utilizing the information from Table 2, the range of total marital satisfaction scores was 0–36.7, with a mean of 11.91. Men reported a range of 0–34.7, a mode of 8, a median of 10, and a mean of 12.08. Women’s scores ranged from 0–36.7, with a mode of 10, a median of 10, and a mean of 11.75. Histograms have been developed to illustrate men’s and women’s scores (Figures 2 and 3). Kurtosis and skewness have also been analyzed; they are shown in Table 3.

Next, a scatter plot was developed with the husbands’ scores on the x-axis and the wives’ scores on the y-axis, demonstrating a positive relationship with a linear regression ($r^2$) of 0.451 (Figure 4). Overall, 35 (97.2%) men and 35 (97.2%) women reported scores below 30, indicating marital satisfaction.

Research Question #2: In married couples with infertility utilizing NPT: What are the differences in marital satisfaction scores between men and women within a couple?
A histogram was created utilizing scores from men subtracted from those of women (Figure 5). In 18 couples, scores were within a 5 point difference. Scores were within a 10-point difference in 12 couples and greater than a 10-point difference in 6 couples. Shapiro–Wilk’s test of normality indicated a normal distribution (p = 0.287). The bell curve also depicted a normal distribution (Figure 6).

The mean scores were then analyzed using a paired samples t-test. The mean score for men was 12.08 and for women it was 11.75, with a positive correlation of 0.672. There was no statistical significance in the differences in scores (p = 0.772) as the mean scores did not differ significantly between men and women (Table 4).

According to Hudson and Glisson (1982), the IMS tool is not designed to evaluate individual questions for clinical use but rather the overall score. The student researcher decided to analyze individual questions for the purpose of assessing any themes or potential differences between men and women which could then be further explored in future studies. Differences in scores between men and women were assessed using a paired samples t-test; the results are presented in Table 5. Differences in the responses of men and women were found to be statistically significant only for the question regarding having a lot of fun together (p = 0.032).

Research Question #3: In married couples with infertility utilizing NPT: What is the relationship between marital satisfaction scores with the demographic variables of age, ethnicity, education, employment, income, financial strain, and religion?

To analyze differences between mean IMS scores and demographic variables, ANOVA testing was carried out. First, demographic variables were re-coded into smaller groups to categorize and organize responses for analysis. One husband responded “prefer not to answer” for age. This result was recorded under the 31–40 years age group as this was the group with the most responses and least likely to have a statistically significantly effect. Once demographics
were re-coded, ANOVA was preformed comparing men’s mean IMS scores to men’s reported demographic variables. Women’s mean IMS scores were then compared to men’s demographic variables. No statistical significance was observed regarding men’s demographics (Table 6).

However, for men’s IMS scores, men’s education level, specifically bachelor degree education, was the only variable that reached a level near statistical significance ($p = 0.054$). Next, women’s mean IMS scores were compared to women’s responses to demographic variables. Subsequently, men’s mean IMS scores and women’s demographic variables were analyzed. No statistical significance was noted in relation to IMS scores and women’s demographics (Table 7).

**Summary**

The results presented in this chapter included a description of marital satisfaction scores and demographic attributes. The sample consisted of 36 couples with mean ages of 34.67 years for men and 33.31 years for women, who were mostly White (86.1% men, 80.6% women). A total of 83.3% of men and 86.1% of women had at least a bachelor degree. Employment rates were 91.4% for men and 74.3% for women, with incomes reported $75,000 or greater by 72.4% of the men and 75% of the women. Both men and women reported living comfortably on their present income (88.9% for men; 94.4% for women). A majority of men (75%) and women (83.3%) reported to be Catholic.

Men reported IMS scores ranging from 0–34.7 with a mean of 12.08. Women’s scores ranged from 0–36.7, with a mean of 11.75. Scatter plots show a positive relationship, with a linear regression ($r^2$) of 0.451. In general, 35 (97.2%) of men and 35 (97.2%) of women reported scores below 30, indicating marital satisfaction.

Although overall mean IMS scores did not differ significantly between men and women, there were some variations. Scores were about the same in 8 couples and within a 10-point difference in 12 couples. However, in 5 couples, scores differed more than 10 points. A paired
samples t-test analyzing mean IMS scores indicated a positive correlation of 0.672, but there was no statistical significance in the differences in scores (p = 0.772). As regards to individual research questions, a statistically significant (p < 0.05) difference was found only in women’s responses being more negative to the question of the couple “having a lot of fun together.” Utilizing ANOVA, there were no statistically significant findings between IMS means and demographic variables.
Chapter Five: The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility

The purpose of this study was to examine marital satisfaction scores and demographic variables in couples who are using NaProTechnology (NPT) for infertility. The Vulnerability-Stress-Adaptation (VSA) Model of Marriage was used to organize and guide the study. This chapter is focused on evaluating the results, limitations, and implications to future studies, practice, policy, and education.

**Discussion of Findings**

Overall, the demographics of the couples were similar to those found in other studies examining infertility. The current study’s sample was similar in age between genders, mostly White, Catholic, with a bachelor degree or higher education, living comfortably within their current income, and with an annual household income of at least $75,000. Childress et al. (2015) examined demographics in women presenting for infertility treatment and found that the mean age was 34.8 years, with 70.1% identifying as White, 90% as having at least a bachelor degree, and 68.4% having an annual income of at least $100,000. Similarly, Pepe and Byrne’s (1991) demographics for women with infertility showed a mean age of 33.6 years; 97.5% were White, 67.5% completed some college, and 82.5% enjoyed employment outside the home. Another study’s demographics were all White couples with a mean age of 29.8 years for women and 30.4 years for men, with employment rates of 97% for men and 84% for women, and 44% of the men and 60% of the women having at least college education (Drosdzol & Skrzypulec, 2009). Studies show that women with higher income, higher employment rates, and of White ethnicity were more likely to pursue infertility treatments (Kessler, Craig, Plosker, Reed, & Quinn, 2013). Furthermore, higher income and White race affected the types of treatment attempted, especially when treatment costs increased (Staniec & Webb, 2007). This could be a results of having the
financial means to pursue higher cost treatments. It is important to note that higher Catholicism rates in the present study may be unique to NPT treatment since NPT is supported and encouraged by Catholic teachings rather than assisted reproductive technologies (Doroski, 2014).

The majority of the participants (97.2%) in the present study reported IMS scores of less than 30, which indicated marital satisfaction. The high marital satisfaction rate could be related to the holistic approach of NPT treatment. However, it could also be related to the demographics of the couples that responded to the study. Close to 85% of couples in the current study had at least a bachelor degree. Previous studies have indicated that higher education levels had a positive effect on marital satisfaction (Amiri et al., 2016; Zhang et al., 2016). The current study found that over 74% of the participating couples had an annual income of greater than $75,000 and over 92% felt they were living comfortably on their current income. Other studies found that couples with low income and financial stress were less satisfied in their marriages (Archuleta, Britt, Tonn, & Grable, 2011; Dakin & Wampler, 2008). Couples with higher education and income reported greater marital satisfaction (Keramat, Masoumi, Mousavi, Poorolajal, Shobeiri, & Hazavehie, 2014; Gardi, 2014). Finally, most couples (more than 79%) in the present study identified themselves as Catholic. Previous studies found that marital satisfaction was higher when a couple shared the same faith (Olson et al., 2015; Olson et al., 2016; Prabu & Stafford, 2015).

The present study’s IMS scores showed a mean of 12.08 for men and a mean of 11.75 for women. In evaluating past research, there were two published studies that utilized the IMS for participants with infertility, one published in 2009 and an older one published in 1991. Drosdzol and Skrzypulec (2009) examined Polish fertile and infertile couples and found that there was an increase in marital dissatisfaction among women of an age above 30 years and who had less education. Interestingly, infertile women showed a mean IMS score of 13.3, while fertile women
showed a mean score of 17.5. Similarly, infertile men had a mean score of 11.6 while fertile men had a mean score of 15.3. Pepe and Byrne (1991) examined IMS scores in women who did not become pregnant despite infertility treatments. The average IMS score before treatment was 14.0, during treatment 19.3, and after treatment 15.4, with statistical significance for the difference in scores before and during treatment. Marital satisfaction was decreased during infertility treatment but appeared to return to the pre-treatment level once treatment was terminated (Pepe and Byrne, 1991). Although still indicating marital satisfaction, Pepe and Byrne’s (1991) mean IMS scores for women during treatment were significantly higher than those observed in the present study. Further studies are needed to determine if IMS scores of couples using NPT are lower than those using other treatments.

Pepe and Byrne (1991) evaluated individual questions in the IMS, finding statistically significantly different answers to the statements “I feel that my partner doesn’t understand me,” “I feel that our relationship is a good one,” “I feel that we have a lot of fun together,” “I feel that we do not have interests in common,” “I feel my partner is a comfort to me,” and “I feel that our relationship is very stable.” The only question in the present study that revealed a statistically significant difference was women’s responses being more negative than men’s to the question “I feel that we have a lot of fun together.”

The present study did find that women reported higher responses to the statements regarding life together with spouse being dull (p = 0.054) and their relationships being less exciting (p = 0.124). Men responded with somewhat higher rates of being treated badly (p = 0.059), having less closeness (p = 0.147), and having less common interests (p = 0.063). Previous studies found that women expressed love through affection and accommodating behaviors while men expressed love through shared activities, affection, and sex (Schoenfeld, Bredow, & Huston, 2012). Another study also indicated that boredom in the relationship
decreases marital satisfaction on the long term, but did not find differences between genders (Tsapeias, Aron, & Orbuch, 2009). Couples participating in new and exciting activities had higher relationship satisfaction that those who did not (Aron, Norman, Aron, McKenna, & Heyman, 2000). Singh (2013) found that men desired mutual respect in their marriage goals, which could be related to the interpretation of how men feel they are treated in the relationship. NPT includes elements of sharing interests, learning new things, and mutual respect within the application of SPICE. Couples are encouraged to evaluate what aspects of their spiritual, physical, intellectual, communication/creativity, and emotional domains are ignored. Their FertilityCare practitioner will then offer methods to develop the areas that the couples feel they need improvement and continue to nurture those that the couples feel are fulfilled. Future studies evaluating these specific factors in marital satisfaction could have an effect on the application of SPICE by determining what items require more attention.

The current study found that scatter plots of men and women’s IMS scores indicated a positive relationship, but that men’s IMS scores did not increase as rapidly as women’s IMS scores. Although not statistically significant, men’s scores were slightly higher than women’s, indicating less marital satisfaction. This finding is in contrast with another study, in which men’s marital satisfaction was found to be higher than women’s marital satisfaction even though demographic characteristics were similar in both studies as mentioned earlier (Drosdzol & Skrzypulec, 2009).

The present study did not reveal statistically significant differences in the analysis of mean IMS scores and demographic variables, which possibly may be a result of the small sample size. Men with a bachelor degree did have somewhat higher mean IMS scores (less marital satisfaction) than those with other education levels ($p = 0.054$). Research shows that college graduates with a bachelor degree have the highest rate ($25\%$) of working in over-qualified jobs,
with career growth found for only 3% for men (Rose, 2017). This could potentially affect marital satisfaction levels as an enduring vulnerability, since employment and loss of prestige can be a trigger for depression in men (Ogrodniczuk & Oliffe, 2011).

Survey Comments

There were 13 responses with comments listed in the optional comments and questions survey. Four of these comments included statements on how NPT and/or the Creighton Model had supported their marriage and made it stronger. One individual noted that NPT had helped the couple communicate better. Two individuals noted that they were seeking counseling to increase communication skills. Gourounti et al. (2012) found that communication and support from each other greatly benefited a couple with infertility.

In terms of the study questionnaires, three individuals stated that demographic questions could have addressed the duration of marriage and infertility. One individual noted that the survey questions were easy and concise. Another individual felt that the questions on the IMS were confusing as some seemed to form double negatives. Finally, another response indicated that some questions should have been more detailed.

Evaluation of theoretical framework

The VSA Model of Marriage application in this study as the theoretical model to help guide the research aims and literature review was appropriate. The model may be considered for use in future studies. The enduring vulnerabilities that a couple encompasses can affect their marital satisfaction. In this study, the enduring vulnerabilities of education, finances, and religion appear to yield similar results to those in previous studies. As the demographics of those who responded were not diverse and the sample size was small, it was difficult to determine if marital satisfaction levels would change if the demographics changed.

The present study did not evaluate the effect of NPT on infertility-related stress and
adaption within the marriage. However, the VSA supports the theoretical applications of NPT encouraging couples to communicate and collaborate in efforts to decrease stress and improve adaptation (coping) processes. Future studies would be necessary to further evaluate and support NPT’s specific role in infertility-related stress and adaptation.

Limitations

The first major limitation of the present study was the small sample size. The initial target sample was 95 couples to accommodate all data testing and account for attrition. The sample size of 36 couples did not reach the target goal for correlation and ANOVA testing, although the sample did reach the goal for paired t-testing. In testing demographic differences with IMS scores, ANOVA was utilized despite the small sample size due to its simplicity. Since there were no significant values found with ANOVA testing, no further testing was completed. It is important to note that the lack of significant values possibly resulted from the small sample size.

Despite efforts to increase the response rate, the final sample size was 36 couples. This is potentially a result of the recruitment strategy and survey design as both of these could have contributed low response rates. This is evidenced by the fact that only 13% of NPT and FertilityCare Centers responded to the email request to have recruitment flyers distributed in their offices. Furthermore, of the 54 sites, only 44 couples responded to the flyers. Finally, requiring both members of the couple to respond may have further decreased the response rate, as one member may not agree to participate. However, including response from only one member would not have allowed us to answer our study questions.

The next limitation was relating to a potential bias in sampling and responses. Sending an email out to NPT and FertilityCare providers to request utilizing their sites increased the risk for potential bias as the health care provider may have responded to the email based on his or her perception of couples within the practice and concern of how this information would have been
represented. Next, using recruitment flyers may pose a risk for bias as couples who are more optimistic about their relationship may be more likely to agree to participate, while those who may be unsatisfied in their relationship may avoid wanting to partake in a study that may force them to evaluate their marital satisfaction. Surveys, in themselves, can lead to potential bias as they are limited to what people are able and willing to report (Polit & Beck, 2012). However, because logistical obstacles as NPT practices and FertilityCare Centers are widely distributed, this strategy was deemed best suitable for the current study.

One potential way to reduce these limitations in future studies would be to have a larger-scale study involving multiple practices to administer the surveys in an office rather than using flyers and mailing out survey packets. Couples could be assessed at the first visit and then again at different intervals through-out and after treatment.

**Implications for Future Studies**

The current study has revealed the need for subsequent studies further examining this subject and exploring causal relationships for various components of NPT treatment and marital satisfaction. Demographics and gender differences can be further detailed and future studies can include length of marriage, length of infertility, cause of infertility, types of infertility treatments attempted, and length of NPT treatment. A future study could explore marital satisfaction on initial visit with repeated testing at specific intervals and on completion of the treatment, examining both unsuccessful treatments and those resulting in pregnancy and live birth. Furthermore, these future studies can compare marital satisfaction in couples using NPT to those using other treatments to assess for any characteristics or results unique to NPT. The role of SPICE could also be further examined in detail to determine its effect on marital satisfaction.
Implications for Practice

Providers in primary care, family practice, and women’s health need to be aware of the stressors an infertility diagnosis and treatment may place on a couple. These stressors can lead to marital dissatisfaction, which can have psychological and physical health consequences. NPT and the Creighton Model address marital unity and satisfaction through the holistic approach and the use of SPICE. In addition, NPT empowers couples as collaborators in diagnosis and treatment. Healthcare providers should be aware that NPT is an option for couples, especially those who have certain religious convictions and those who are seeking a more holistic approach.

Implications for Policy

Only 15 states have a mandate for infertility coverage by insurance plans (Sunderam et al., 2018). Because NPT treats infertility as a consequence of chronic medical conditions, diagnosis and treatment are often covered by insurances since the underlying conditions are being treated. However, certain diagnostic testing may not be covered, such as semen analysis and follicle series ultrasounds, as these are only used for infertility treatments. In addition, some NPT treatments are considered “off label” as they may not be formally approved for indication, population, route, or dosage. Some insurances will not pay for “off label” treatments. Policy changes that would benefit couples using NPT would include introducing more laws for infertility coverage as well as allowing the use of “off label” treatments if deemed appropriate by the healthcare provider. Finally, primary care and family practice providers who offer NPT services are often unable to bill as specialty services, which incur a higher reimbursement rate. Management of an NPT patient requires additional time and labor, which often are not compensated. Including NPT as a specialty practice may attract more providers to sub-specialize in this field.
Implications for Education

NPT should be included as a treatment option for couples with infertility, especially those who do not want to pursue assisted reproductive technologies. Although a small number of institutions include it in their curriculum, most programs are unaware of its existence. In addition, students, especially those who encounter couples with infertility, should be aware to assess the psychological effects and stressors that may arise. Stressors may contribute to marital dissatisfaction and, ultimately, lead to the divorce of the couple.

Summary

The present study has provided information on marital satisfaction scores among men and women utilizing NPT for infertility. The majority of the sample reported marital satisfaction with no significant differences between men and women. The demographics of the study were similar to previous studies examining marital satisfaction and infertility. Since the demographics were not diverse and the sample size was small, it was difficult to determine any significant relationships between demographics and IMS scores. Future studies would be necessary to determine if the couples had high marital satisfaction levels because of the NPT treatment or because of their enduring vulnerabilities (demographics). This dissertation can serve as a basis for future studies on marital satisfaction.
Dissertation Conclusion

Infertility can pose added stress on a marriage, subsequently affecting marital satisfaction. The decreased ability to conceive or carry a pregnancy to live birth affects one in sixteen married women. This prevalent condition can be treated with a restorative reproductive medicine called NaProTECHNOLOGY (NPT), aimed to diagnose and treat underlying chronic conditions that result in infertility. NPT incorporates a holistic approach inclusive of the well-being of a couple’s relationship. There were no published studies that examined marital satisfaction levels in couples using NPT for infertility. This dissertation has evaluated marital satisfaction levels in 36 couples with infertility treated with NPT.

This study found that 97.1% of men and women scored less than 30 on the Index of Marital Satisfaction (IMS), which indicates marital satisfaction. The mean IMS score for men was 12.08 and for women 11.75. The mean IMS scores, indicating marital satisfaction, are similar to previous studies that utilized the IMS in men and women with infertility. Although mean IMS scores did not differ significantly in men and women, there was a positive correlation of 0.711. In addition, there were no statistically significant differences in demographic variables and IMS scores.

Limitations of the study included the small sample size and a potential bias in sampling and questionnaire responses. Future studies could decrease these limitations by administering the surveys in an office rather than through mailed paper materials. In addition, future studies could include more extensive demographic questions on marriage and infertility characteristics. Futures studies could assess various components of NPT and compare them to other types of infertility treatments. Overall, this dissertation has provided data suggesting that a majority of couples utilizing NPT for infertility are satisfied in their marriages.
References


EFFECT OF NAPROTECHNOLOGY


doi:10.1037/a0025279


Shargh, N., Bakhshani, N. M., Mohebbi, M. D., Mahmudian, K., Ahovan, M., Mokhtari, M., & Gangali, A. (2015). The effectiveness of mindfulness-based cognitive group therapy on


doi:10.7860/JCDR/2016/17836.8077


doi:10.1177/0265407512462681


http://doi.org/10.1111/j.1475-6773.2006.00640.x


EFFECT OF NAPROTECHNOLOGY


Figure 2. Mean Index of Marital Satisfaction, men’s scores
Figure 3. Mean Index of Marital Satisfaction, women’s scores
Figure 4. Scatter plot of men’s IMS scores (x-axis) and women’s IMS scores (y-axis)
Figure 5. Mean women’s IMS scores minus mean men’s IMS scores.
Figure 6. Bell curve of mean women’s IMS scores minus mean men’s scores
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<th>Number of Participating Centers</th>
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<td>California</td>
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<tr>
<td>Connecticut</td>
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</tr>
<tr>
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</tr>
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<td>Indiana</td>
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</tr>
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<td>Kentucky</td>
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<td><strong>Total</strong></td>
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Table 1

*Participating NPT and FertilityCare Centers by state*
Table 2
*IMS scores within couples*

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*Note:* Marital satisfaction is considered adequate when a score is less than 30.
Table 3
*Demographic variables among men and women*

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<tr>
<td>Less than bachelor degree</td>
<td>6</td>
<td>16.7%</td>
<td>5</td>
<td>13.9%</td>
</tr>
<tr>
<td>Bachelor degree</td>
<td>18</td>
<td>50%</td>
<td>16</td>
<td>44.4%</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>12</td>
<td>33.3%</td>
<td>15</td>
<td>41.7%</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed, 1–35 hours/week</td>
<td>3</td>
<td>8.3%</td>
<td>12</td>
<td>33.3%</td>
</tr>
<tr>
<td>Employed, 36 or more hours/week</td>
<td>33</td>
<td>91.7%</td>
<td>15</td>
<td>41.7%</td>
</tr>
<tr>
<td>Not employed/Not looking for work</td>
<td>0</td>
<td>-</td>
<td>9</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Annual Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $75,000</td>
<td>7</td>
<td>19.51%</td>
<td>6</td>
<td>16.7%</td>
</tr>
<tr>
<td>$75,000 to $99,999</td>
<td>8</td>
<td>22.2%</td>
<td>10</td>
<td>27.8%</td>
</tr>
<tr>
<td>$100,000 to $149,999</td>
<td>11</td>
<td>30.6%</td>
<td>12</td>
<td>33.3%</td>
</tr>
<tr>
<td>$150,000 or More</td>
<td>7</td>
<td>19.6%</td>
<td>5</td>
<td>13.9%</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>3</td>
<td>8.3%</td>
<td>3</td>
<td>8.3%</td>
</tr>
<tr>
<td><strong>Financial strain</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living comfortably on present income</td>
<td>32</td>
<td>88.9%</td>
<td>34</td>
<td>94.4%</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>11.1%</td>
<td>2</td>
<td>5.6%</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
### Table 4

*Paired samples t-test for women’s IMS scores and men’s IMS scores*

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>SEM</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>95% Confidence interval of the difference</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Women’s score (n = 36)</strong></td>
<td>0</td>
<td>36.7</td>
<td>11.747</td>
<td>8.5503</td>
<td>1.4251</td>
<td>0.964</td>
<td>0.393</td>
<td>0.685</td>
<td>0.768</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Men’s score (n = 36)</strong></td>
<td>0</td>
<td>34.7</td>
<td>12.078</td>
<td>8.1762</td>
<td>1.3627</td>
<td>0.908</td>
<td>0.393</td>
<td>0.413</td>
<td>0.768</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Women’s score minus men’s score</strong></td>
<td>-3.306</td>
<td>6.7835</td>
<td>1.1306</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-2.6258</td>
<td>1.9647</td>
<td>-0.292</td>
<td>35</td>
</tr>
</tbody>
</table>
### Paired samples t-test for individual IMS responses

<table>
<thead>
<tr>
<th>Paired differences</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Standard deviation</td>
<td>SEM</td>
<td>95% Confidence interval of the difference</td>
</tr>
<tr>
<td>Lower</td>
<td>Upper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women's score minus men's score</td>
<td>0.3306</td>
<td>6.7835</td>
<td>1.1306</td>
</tr>
<tr>
<td>1. My partner is affectionate enough.</td>
<td>-</td>
<td>1.450</td>
<td>0.242</td>
</tr>
<tr>
<td>2. My partner treats me badly</td>
<td>-</td>
<td>0.770</td>
<td>0.128</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>SEM</th>
<th>95% Confidence interval of the difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower</td>
<td>Upper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.111</td>
<td>0.250</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>3. My partner really cares for me.</td>
<td>1.068</td>
<td>0.178</td>
<td>-0.417</td>
</tr>
<tr>
<td>4. I feel that I would not choose the same partner if I had it to do over.</td>
<td>1.222</td>
<td>0.204</td>
<td>-0.553</td>
</tr>
<tr>
<td>5. I feel that I can trust my partner.</td>
<td>0.056</td>
<td>0.532</td>
<td>0.089</td>
</tr>
<tr>
<td>6. I feel that our relationship is breaking up</td>
<td>0.056</td>
<td>0.532</td>
<td>0.089</td>
</tr>
<tr>
<td>7. My partner really doesn't understand me.</td>
<td>1.228</td>
<td>0.205</td>
<td>-0.499</td>
</tr>
<tr>
<td>8. I feel that our relationship is a good one.</td>
<td>0.056</td>
<td>0.754</td>
<td>0.126</td>
</tr>
<tr>
<td>9. Ours is a very happy relationship.</td>
<td>0.139</td>
<td>0.723</td>
<td>0.121</td>
</tr>
<tr>
<td>10. Our life together is dull.</td>
<td>0.222</td>
<td>0.898</td>
<td>0.150</td>
</tr>
<tr>
<td>11. We have a lot of fun together.</td>
<td>0.822</td>
<td>0.137</td>
<td>-0.584</td>
</tr>
<tr>
<td>12. My partner does not confide in me.</td>
<td>0.306</td>
<td>1.431</td>
<td>0.238</td>
</tr>
<tr>
<td>13. Ours is a very close relationship.</td>
<td>0.222</td>
<td>0.898</td>
<td>0.150</td>
</tr>
<tr>
<td>14. I feel that I cannot rely on my partner.</td>
<td>1.194</td>
<td>0.199</td>
<td>-0.460</td>
</tr>
<tr>
<td>15. I feel that we do not have enough interests in common.</td>
<td>1.042</td>
<td>0.174</td>
<td>-0.686</td>
</tr>
<tr>
<td>16. We manage arguments and disagreements very well.</td>
<td>0.028</td>
<td>0.878</td>
<td>0.146</td>
</tr>
<tr>
<td>17. We do a good job of managing our finances.</td>
<td>0.967</td>
<td>0.161</td>
<td>-0.411</td>
</tr>
<tr>
<td>18. I feel that I should never have married my partner.</td>
<td>0.028</td>
<td>0.654</td>
<td>0.109</td>
</tr>
<tr>
<td>19. My partner and I get along very well together.</td>
<td>0</td>
<td>0.717</td>
<td>0.120</td>
</tr>
<tr>
<td>20. Our relationship is very stable.</td>
<td>0.609</td>
<td>0.101</td>
<td>-0.234</td>
</tr>
<tr>
<td>21. My partner is a real comfort to me.</td>
<td>0.139</td>
<td>0.990</td>
<td>0.165</td>
</tr>
</tbody>
</table>
22. I feel that I no longer care for my partner.  
- 0.028 0.506 0.084 -0.199 0.144 -0.329 35 0.744

23. I feel that the future looks bright for our relationship.  
- 0.111 0.854 0.142 -0.400 0.178 -0.780 35 0.441

24. I feel that our relationship is empty.  
0.111 0.708 0.118 -0.129 0.351 0.941 35 0.353

25. I feel there is no excitement in our relationship.  
0.278 1.059 0.176 -0.080 0.636 1.574 35 0.124

*p < 0.05.

Table 6  
Analysis of variance (ANOVA) results for demographics in men

<table>
<thead>
<tr>
<th>Variable</th>
<th>Men (n = 36)</th>
<th>Mean IMS scores – men</th>
<th>Men age–men IMS p-value</th>
<th>Mean IMS scores – women</th>
<th>Men age–women IMS p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21–30</td>
<td>8</td>
<td>12.5</td>
<td>0.977</td>
<td>8.01</td>
<td>0.293</td>
</tr>
<tr>
<td>31–40</td>
<td>20</td>
<td>12.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greater than 41</td>
<td>8</td>
<td>11.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>31</td>
<td>12.30</td>
<td>0.687</td>
<td>12.25</td>
<td>0.392</td>
</tr>
<tr>
<td>Other/Prefer not answer</td>
<td>5</td>
<td>10.68</td>
<td></td>
<td></td>
<td>8.66</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than bachelor degree</td>
<td>6</td>
<td>7.67</td>
<td>0.054</td>
<td>8.57</td>
<td>0.374</td>
</tr>
<tr>
<td>Bachelor degree</td>
<td>18</td>
<td>15.26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate degree</td>
<td>12</td>
<td>12.08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed, 1–35 hours/week</td>
<td>3</td>
<td>13.13</td>
<td>0.819</td>
<td>14.03</td>
<td>0.635</td>
</tr>
<tr>
<td>Employed, 36 or more hours/week</td>
<td>33</td>
<td>11.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $75,000</td>
<td>7</td>
<td>16.39</td>
<td>0.206</td>
<td>8.74</td>
<td>0.801</td>
</tr>
<tr>
<td>$75,000 to $99,999</td>
<td>8</td>
<td>9.18</td>
<td></td>
<td></td>
<td>5.60</td>
</tr>
<tr>
<td>$100,000 to $149,999</td>
<td>11</td>
<td>8.85</td>
<td></td>
<td></td>
<td>5.41</td>
</tr>
<tr>
<td>$150,000 or more</td>
<td>7</td>
<td>14.77</td>
<td></td>
<td></td>
<td>9.46</td>
</tr>
</tbody>
</table>
### Table 7
Analysis of variance (ANOVA) results for demographics in women

<table>
<thead>
<tr>
<th>Variable</th>
<th>Women (n = 36)</th>
<th>Mean IMS scores – women</th>
<th>Women age–women IMS p-value</th>
<th>Mean IMS scores – men</th>
<th>Women age–men IMS p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21–30</td>
<td>13</td>
<td>8.16</td>
<td>0.133</td>
<td>10.11</td>
<td>0.480</td>
</tr>
<tr>
<td>31–40</td>
<td>19</td>
<td>14.32</td>
<td></td>
<td>13.65</td>
<td></td>
</tr>
<tr>
<td>Greater than 41</td>
<td>4</td>
<td>11.18</td>
<td></td>
<td>11.03</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>29</td>
<td>8.96</td>
<td>0.213</td>
<td>12.69</td>
<td>0.366</td>
</tr>
</tbody>
</table>
EFFECT OF NAPROTECHNOLOGY

<table>
<thead>
<tr>
<th>Other/Prefer not answer</th>
<th>7</th>
<th>5.7</th>
<th>9.53</th>
</tr>
</thead>
</table>

**Education**

<table>
<thead>
<tr>
<th>Less than bachelor degree</th>
<th>5</th>
<th>10.28</th>
<th>0.435</th>
<th>12.02</th>
<th>0.707</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor degree</td>
<td>16</td>
<td>10.13</td>
<td></td>
<td>10.88</td>
<td></td>
</tr>
<tr>
<td>Graduate degree</td>
<td>15</td>
<td>13.96</td>
<td></td>
<td>13.38</td>
<td></td>
</tr>
</tbody>
</table>

**Employment**

<table>
<thead>
<tr>
<th>Employed, 1–35 hours/week</th>
<th>12</th>
<th>11.40</th>
<th>0.352</th>
<th>13.67</th>
<th>0.247</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed, 36 or more hours/week</td>
<td>15</td>
<td>9.95</td>
<td></td>
<td>9.38</td>
<td></td>
</tr>
<tr>
<td>Not employed/Not looking for work</td>
<td>9</td>
<td>15.20</td>
<td></td>
<td>14.46</td>
<td></td>
</tr>
</tbody>
</table>

**Annual Income**

<table>
<thead>
<tr>
<th>Less than $75,000</th>
<th>6</th>
<th>13.68</th>
<th>0.901</th>
<th>16.33</th>
<th>0.424</th>
</tr>
</thead>
<tbody>
<tr>
<td>$75,000 to $99,999</td>
<td>10</td>
<td>9.47</td>
<td></td>
<td>9.14</td>
<td></td>
</tr>
<tr>
<td>$100,000 to $149,999</td>
<td>12</td>
<td>12.12</td>
<td></td>
<td>10.83</td>
<td></td>
</tr>
<tr>
<td>$150,000 or More</td>
<td>5</td>
<td>12.94</td>
<td></td>
<td>13.60</td>
<td></td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>3</td>
<td>12.00</td>
<td></td>
<td>15.80</td>
<td></td>
</tr>
</tbody>
</table>

**Financial strain**

| Living comfortably on present income | 34| 11.57 | 0.622 | 12.06 | 0.962 |
| Other | 2| 14.7  |       | 6.15  |       |

**Religion**

| Catholic | 30| 12.52 | 0.233 | 11.65 | 0.487 |
| Non-Catholic | 6| 7.9   |       | 14.23 |       |
Appendix A
University of Connecticut

Volunteers Wanted for a Research Study

Title of Study: The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility

The purpose of this research is to examine marital interaction in couples with infertility who are using NaProTECHNOLOGY. Demographic variables will also be assessed. Participation consists of completing an 8 multiple choice question demographics survey and the Index of Marital Satisfaction, which consists of 25 questions which are answered using a scale. Each couple will have two weeks to complete and return the study, which will include prepaid postage.

To be participate in the study, you must:

☑ Be 18 years or older
☑ Be legally married
☑ Be able to speak and read English
☑ Be diagnosed with infertility (at least one year of trying to conceive pregnancy or unable to carry pregnancy to live birth)
☑ Using NaProTECHNOLOGY
☑ Both spouses be willing to participate (with separate surveys and prepaid mailing envelopes)

Participants will receive a $5 gift card ($10 per couple)

To participate in this research, please contact Anna Camacho, MSN at 508-280-9853 or email at anna.camacho@uconn.edu

This research is conducted under the direction of Dr. Annette Jakubisin Konicki, PhD, School of Nursing

UCONN IRB PROTOCOL X17-180 APPROVED 12/27/17
Information Sheet for Participation in a Research Study

Student Investigator: Anna Camacho, MSN
Principal Investigator: Annette Jakubisin Konicki PhD
Study Title: The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility

Introduction

You are invited to participate in a research study to examine the level of marital interaction in couples with infertility who are treated with NaProTECHNOLOGY. I am a graduate student at the University of Connecticut, and I am conducting this survey as part of my course work.

Why is this study being done?

There are no current, published studies examining marital interaction in couple with infertility who are being treating with NaProTECHNOLOGY. The purpose of this research is to study the effect of treatment on marital interaction. In addition, it will examine demographic factors of age, sex, ethnicity, education, employment, income, financial strain, and religion.

What are the study procedures? What will I be asked to do?

You will be asked to complete the attached multiple choice 8 question demographics survey and complete a standardized survey instrument that is well established in other studies of marital interaction, which consists of 20 questions that are rated on a scale of 1 through 5 on the topic of your relationship with your spouse. Each spouse will complete a survey on their own and will have separate, prepaid, mailing envelopes.

In order to participate, both spouses need to complete the surveys, otherwise they will not be used in the study. On the demographic survey, there will be an option to “prefer not to answer”. On the survey instrument, all questions will need to be answered to participate in order to properly assess the results. If you are not comfortable answering a question, you may stop with the survey and return study materials.

Couples will be able to participate in the study if they are: 18 years or older, English speaking, legally married, AND being treated with NaProTECHNOLOGY for infertility. Participants will be recruited through flyers distributed at various NaProTECHNOLOGY clinics.
What other options are there?

You have the option to not participate in the study. Participation or refusal does not change the care you will receive by your provider.

What are the risks or inconveniences of the study?

The questions asked are designed to measure the level of marital satisfaction you have in your present marriage. Some questions may make you think about unpleasant aspects of your relationship. You can refuse participation at any point during the study if you are uncomfortable answering any questions. It is not recommended you discuss or share your answers with your spouse prior to returning the surveys. If you decide to review your answers with your spouse (after surveys are complete) and major disagreement arises, it is important you seek out help from your medical provider in order to discuss any issues.

What are the benefits of the study?

The benefit of participating in the study to you is that by completing the questionnaire, you can assess the level of marital satisfaction in your relationship. Although the survey is not a diagnostic tool, it may help prompt you to seek professional help to better evaluate your situation.

In addition, you will have the benefit of knowing that you helped contribute evidence for a topic (NaProTECHNOLOGY and marital satisfaction in couples with infertility) that has not been well studied. This could lead to more in depth studies on this topic and subsequently improve care for others in the future.

Will I receive payment for participation? Are there costs to participate?

You will not be paid for participation. A $5 Amazon Gift card is enclosed as a token of appreciation to each individual ($10 total per couple). There are no costs to participate.

How will my personal information be protected?

Any contact information including addresses, phone numbers, and email addresses will be stored on an Excel file only listing contact information. This file will be password protected and stored on a USB drive which will not contain any other files. All study packets will be numbered and then placed in envelopes. The envelopes will then be mailed out at random to each couple who wishes to participate in the study. In returning the envelope, the return address will be preprinted the same as the “to” address. This will allow questionnaires to remain anonymous. Please do not write your name on any surveys. If you complete the optional comments survey, please mail it out in the separate envelope. These surveys and any other data will be maintained in a locked filing cabinet over the course of three years. Then, all material will be deleted and/or shredded.

You should also know that the UConn Institutional Review Board (IRB) and Research Compliance Services may inspect study records as part of its auditing program, but these reviews will only focus on the researchers and not on your responses or involvement. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.
Can I stop being in the study and what are my rights?

You do not have to be in this study if you do not want to. If you agree to be in the study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

Whom do I contact if I have questions about the study?

Take as long as you like before you make a decision. We will be happy to answer any question you have about this study. If you have further questions about this project or if you have a research-related problem, you may contact the student researcher (Anna Camacho, 508-280-9853 or anna.camacho@uconn.edu) or the principal investigator (Dr. Annette Jakubisins Konicki 860-486-2418 or annette.jakubisins konicki@uconn.edu). If you have any questions concerning your rights as a research subject, you may contact the University of Connecticut Institutional Review Board (IRB) at 860-486-8802.

By completing and returning this study packet, you are implying consent and that you meet the follow requirements:

☑ 18 years or older
☑ Am legally married
☑ English speaking
☑ Have been diagnosed with infertility
☑ Using NaProTECHNOLOGY for infertility

*If you do not meet one or more of these criteria, please do not continue this survey. Please return study materials using prepaid envelope.

Please keep this form for your records. Please make efforts not to discuss the study questions with your spouse until surveys are completed and returned.

Please return Demographics Survey and survey instrument within two weeks or receiving this packet.
Appendix C

Student Investigator: Anna Camacho, MSN
Principal Investigator: Annette Jakubisin Konicki, PhD

Thank you for participating in this study. Your participation has been beneficial with obtaining data for this research. Please answer the following questions on your experience with the study.

Please return this optional survey within two weeks in ONE of the enclosed envelopes (SEPARATE from the study packet).

Optional Comments or Questions:

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Would you like to be contacted to address any questions or concerns relating to this study?

☐ Yes
☐ No

If yes, please provide contact information (name and phone number or email address:

______________________________________________________________________________

You will be contacted within two weeks. You may also call or email the student researcher at 508-280-9853 or anna.camacho@uconn.edu.

This survey will be anonymous unless contact information provided.
Appendix D

DATE: December 27, 2017

TO: Annette Jakubisin-Konicki, PhD, APRN
Anna Camacho, Student Investigator
School of Nursing

FROM: Pamela I. Erickson, Ph.D.
Chair, Institutional Review Board
FWA# 00007125

RE: Exemption #X17-180, “The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility”
Please refer to the Exemptions in all future correspondence with the IRB.
Funding Source: Investigator Out-of-Pocket
Approved on: December 27, 2017

The Institutional Review Board (IRB) reviewed the “Request for Exemption” for the research study referenced above. According to the information provided, the IRB determined that this research is exempt from continuing IRB review under 45 CFR 46.101(b)(2): Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation. Enclosed please find the validated information sheet. An approved, validated information sheet (with the IRB’s stamp) must be used to consent each participant.

All investigators at the University of Connecticut are responsible for complying with the attached IRB “Responsibilities of Research Investigators”.

Any proposed changes that may affect the exempt status of the research study must be submitted to the IRB for review and approval prior to their implementation.

Attachments:
1. Validated IRB-5 Application and Protocol
2. Validated Appendix A Form
3. Validated Information Sheet
4. Validated Recruitment Material
5. “Responsibilities of Research Investigators”
Appendix E

Response to inquiries whether via email or verbal:

“You are invited to participate in a research study to examine the effect of fertility treatment on marital interaction and relation to demographic variables in couples with infertility who are being treated with NaProTECHNOLOGY. I am a graduate student at the University of Connecticut, and I am conducting this survey as part of my course work.

Participation consists of completing a demographics survey and research tool, both of which will be mailed out to you along with an information sheet which further details this study.

Participation is voluntary and you can choose to stop participating at any time.

In order to participate, you must meet all the following requirements:

- 18 years or older
- Am legally married
- English speaking
- Have been diagnosed with infertility
- Using NaProTECHNOLOGY for infertility

In addition, both spouses need to complete the surveys in order to participate.

If you are interested in participating, please provide a mailing address to where the study packet may be sent. Your address will be stored on a password protected file and will not be shared or used for other purposes outside this study. Thank you for your time and consideration for being a part of this research.”
Appendix F

Study Title: The Effect of NaProTECHNOLOGY on Marital Interaction in Couples with Infertility

Please return Demographics Survey and Index of Marital Satisfaction Survey within two weeks or receiving this packet.

Demographics Survey Page 1 of 2

Please check off one answer per each question.

1. Are you male or female?
   □ Male
   □ Female
   □ Prefer not to answer

2. What is your age?
   ____________ years
   □ Prefer not to answer

3. What race do you identify yourself with?
   □ White
   □ Black or African-American
   □ American Indian or Alaskan Native
   □ Asian
   □ Native Hawaiian or other Pacific Islander
   □ From multiple races
   □ Some other race
   □ Prefer not to answer

4. What is the highest level of school you have completed or the highest degree you have received?
   □ Less than high school degree
   □ High school degree or equivalent (e.g., GED)
   □ Some college but no degree
   □ Associate degree
   □ Bachelor degree
   □ Graduate degree
Demographics Survey Page 2 of 2

5. Which of the following categories best describes your employment status?
   □ Employed, working 1-35 hours per week
   □ Employed, working 36 or more hours per week
   □ Not employed, looking for work
   □ Not employed, NOT looking for work
   □ Retired
   □ Disabled, not able to work
   □ Prefer not to answer

6. How much total combined money did all members of your HOUSEHOLD earn in 2016?
   □ Less than $20,000
   □ $20,000 to $34,999
   □ $35,000 to $49,999
   □ $50,000 to $74,999
   □ $75,000 to $99,999
   □ $100,000 to $149,999
   □ $150,000 or More
   □ Prefer not to answer

7. How do you feel about your present household?
   □ Living comfortably on present income
   □ Coping on present income
   □ Finding it difficult on present income
   □ Finding it very difficult on present income
   □ Prefer not to answer

8. Do you identify with any of the following religions?
   □ Protestant
   □ Catholic
   □ Christian
   □ Judaism
   □ Islam
☐ Buddhism
☐ Hinduism
☐ Native American
☐ Inter/Non-denominational
☐ No religion
☐ Other
☐ Prefer not to answer

Please continue to the Index of Marital Satisfaction Survey. Thank you.
INDEX OF MARITAL SATISFACTION (IMS)

Name: ____________________________  Today's Date: ______________

This questionnaire is designed to measure the degree of satisfaction you have with your present marriage. It is not a test, so there are no right or wrong answers. Answer each item as carefully and as accurately as you can by placing a number beside each one as follows.

1 = None of the time
2 = Very rarely
3 = A little of the time
4 = Some of the time
5 = A good part of the time
6 = Most of the time
7 = All of the time

1. ____ My partner is affectionate enough.
2. ____ My partner treats me badly.
3. ____ My partner really cares for me.
4. ____ I feel that I would not choose the same partner if I had it to do over again.
5. ____ I feel that I can trust my partner.
6. ____ I feel that our relationship is breaking up.
7. ____ My partner really doesn't understand me.
8. ____ I feel that our relationship is a good one.
9. ____ Ours is a very happy relationship.
10. ____ Our life together is dull.
11. ____ We have a lot of fun together.
12. ____ My partner does not confide in me.
13. ____ Ours is a very close relationship.
14. ____ I feel that I cannot rely on my partner.
15. ____ I feel that we do not have enough interests in common.
16. ____ We manage arguments and disagreements very well.
17. ____ We do a good job of managing our finances.
18. ____ I feel that I should never have married my partner.
19. ____ My partner and I get along very well together.
20. ____ Our relationship is very stable.
21. ____ My partner is a real comfort to me.
22. ____ I feel that I no longer care for my partner.
23. ____ I feel that the future looks bright for our relationship.
24. ____ I feel that our relationship is empty.
25. ____ I feel there is no excitement in our relationship.