THE PSYCHOLOGICAL IMPACT OF IN VITRO FERTILIZATION AND INTRA CYTOPLASMIC SPERM INJECTION ON INFERTILE LEBANESE MEN AND WOMEN

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I couldn’t have done it without you!

Abstract

The purpose of this study was to examine the psychological impact of Assisted Reproductive Techniques (ART) mainly In Vitro Fertilization (IVF) and Intra Cytoplasmic Sperm Injection (ICSI) on infertile men and women undergoing treatment in Lebanon. Differences in depression, state anxiety, and overall marital satisfaction levels were examined among infertile men and women taking into consideration each partner's responsibility in infertility. Sixty infertile couples undergoing infertility treatment were divided into 3 groups; 20 couples with female infertility, 20 couples with male infertility, and 20 couples with combined male and female infertility. Participants completed the Beck Depression Inventory – II (BDI-II), the State Anxiety Inventory Form, and the Index of Marital Satisfaction (IMS) questionnaire individually. Results showed differences between men and between women on depression and state anxiety levels depending on who was responsible for infertility. Overall, women displayed higher levels of depression than men irrespective of responsibility for infertility. However, results further indicated that marital satisfaction levels were lowest for couples with female infertility, followed by couples with male infertility, and highest for couples with combined infertility. All the hypotheses in this study were supported.

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THE PSYCHOLOGICAL IMPACT OF IN VITRO FERTILIZATION AND INTRA CYTOPLASMIC SPERM INJECTION ON INFERTILE LEBANESE MEN AND WOMEN

This chapter briefly discusses the purpose of this study, a small introduction to infertility, the solutions available and an explanation of the In Vitro Fertilization and Intra Cytoplasmic Sperm Injection procedures used in this study. A brief literature review of infertile men and women will be examined with respect to depression, state anxiety and marital satisfaction levels. Finally, an overview of methodology, the significance of this study, and the statements of hypotheses will be discussed.

1.1 Introduction to Infertility

The purpose of this paper was to examine the psychological impact of Assisted Reproductive Techniques (ART) mainly In Vitro Fertilization (IVF) and Intra Cytoplasmic Sperm Injection (ICSI) on infertile men and women undergoing treatment in Lebanon. Infertility can be defined as the inability to conceive after a year or more of regular unprotected sexual intercourse (Reis, Xavier, Coelho, & Montenegro, 2013; Greil, Slauson-Blevins, & McQuillan, 2010; Forsythe, 2009). Infertility can be further divided into primary infertility and secondary infertility. Primary infertility is when a couple have not conceived after a year of regular unprotected sexual intercourse and have not conceived at all before. Secondary infertility is when a couple have already had a child or more and then are unable to conceive after a year of regular unprotected sexual intercourse (Forsythe, 2009). There have been many studies in Western countries suggesting that infertility has been on the increase and has become one of the main stressors in the lives of married couples (El Kissi et al., 2013).

According to data from the World Health Organization, "infertility affects approximately eight to twelve percent of couples of reproductive age (between 15 to 49 years) worldwide" (as cited in Abu-Rabia, 2013, p.54). In Middle Eastern countries, infertility affects between ten to fifteen percent of married couples (Abu-Rabia, 2013). Hence, it is important to examine the psychological impact infertility treatment has on infertile men and women. Studies that examined anxiety and depression levels of infertile couples undergoing ART treatments, such as the study done by Reis et al (2013), did not take into consideration which partner was responsible for the infertility. Therefore, this study intended to focus on depression, state anxiety, as well as marital satisfaction among infertile couples undergoing specifically In Vitro Fertilization (IVF) and Intra Cytoplasmic Sperm Injection (ICSI) with respect to which partner was responsibility for the infertility.

Fertility plays an important role in the lives of people causing many couples to feel that the inability to reproduce is a tragedy (Reis et al., 2013; Abu-Rabia, 2013). Previous research has focused on infertility as a medical condition perceived as a devastating experience with many psychological complications (Reis et al., 2013; Greil et al., 2010). Although there seems to be a high prevalence of male infertility, most of the times infertility is blamed on women. This implies an underestimation of the likelihood of male infertility in most societies. According to research by Karpman, Williams, & Lipshultz (2005) and Abu Rabia (2013), a third of the time physiological problems can be identified in infertile women, a third of the time in infertile men, and about a tenth of the time in both partners suggesting that most of the time, infertility can be attributed to a physiological cause in either partner (see Appendix VI, Figure 1.1 for percentage of infertility). Sometimes, the cause of infertility cannot be determined and these cases range between 20 – 25 percent known as unexplained infertility

(Karpman, Williams, & Lipshultz, 2005). This study examined the psychological impact of infertility treatment where the cause of infertility related to men only, women only, and both men and women.

1.2 Solutions to Infertility

One of the traditional solutions to infertility in Middle Eastern societies was polygamous marriage among certain groups (Abu-Rabia, 2013). Other solutions to infertility involve treating the partners with hormones, vitamins and/or surgery. In infertile women, ovarian stimulation can be given, a hormone treatment used for women with ovarian dysfunction. Infertile women may also undergo surgical therapy in case of tubal problems. In infertile men, vitamins can be given for sperm problems and surgical therapy can be done for varicose problems (Greil et al., 2010). Other more modern solutions to infertility involve Assisted Reproductive Techniques (ART) which includes Intrauterine Insemination (IUI) and Cryopreservation which will be discussed in the next chapter. Other ART treatments are In Vitro Fertilization (IVF) and Intra Cytoplasmic Sperm Injection (ICSI) which the present study focused on. The focus was on couples with primary infertility (meaning couples that have not conceived before) who are seeking treatment through In Vitro Fertilization (IVF) and Intra Cytoplasmic Sperm Injection (ICSI). In Vitro Fertilization (IVF) is a procedure that has been used since 1969 for female infertility. Women with blocked tubes are unable to get pregnant due to the lack of connection between the sperm deposited in the vagina or uterus and the ova in the ovarian follicles. This procedure has been used if infertility is caused only by the female. In cases where males are the cause of infertility, Intra Cytoplasmic Sperm Injection (ICSI) technique is used. ICSI was introduced in the late eighties, early nineties to help couples conceive in cases of sperm dysfunction (Karpman, Williams, & Lipshultz, 2005).

These two techniques were the treatments used for infertile women and men in this study. The procedure of IVF and ICSI is presented below.

IVF involves women receiving injections with Follicle Stimulating Hormones (FSH) for around 10 days to stimulate the development of many follicles in the women's ovaries. The development of follicles in the ovaries is monitored by ultrasound until there is one or more of the follicles having a diameter of at least 17mm. The women will then receive an injection with Human Chorionic Gonadotropin (HCG) and 35 hours later the follicles will be aspirated "picked up" vaginally by a needle under ultrasound. That same day, the men would have provided a semen sample. In the IVF procedure, the sample of washed spermatozoa (50,000 spermatozoa) will be deposited around each ovum "picked up" vaginally and each ovum will be allowed to fertilize spontaneously in an incubator at body temperature (37 degrees Celsius) for 2 days. Fertilization and division will occur and one or two embryos from those formed will be transferred into the uterine cavity (see Appendix VII, Figure 1.2 for IVF procedure). When men have very low sperm count as low as a few spermatozoa, one single spermatozoon will be injected into the "picked up" ovum directly to obtain fertilization and division; this procedure is called Intra Cytoplasmic Sperm Injection (ISCI; see Appendix VII, Figure 1.3 for ICSI procedure). ICSI is commonly used nowadays in fear that sometimes the spermatozoa deposited around the ovum in classical IVF might not penetrate spontaneously and fertilize the ovum (Karpman, Williams, & Lipshultz, 2005). These two techniques were used in this study with respect to whether the infertility was a female factor, a male factor or a combined factor. As can be seen from these two explained treatment procedures, a large amount of time, energy, patience and money is required. Hence, infertile women and men undergoing such

treatment may be highly affected psychologically in terms of depression, anxiety and overall marital satisfaction levels.

1.3 Brief Literature Review

ART techniques in general increase stress levels due to the inability to conceive naturally as well as having to undergo medical treatments (Reis et al., 2013). The idea of treatment on its own creates more stress and anxiety than the diagnosis of infertility per se and has shown to be a large burden on couples physically, emotionally and/or economically (Reis et al., 2013; El Kissi et al., 2013). In a study by Wichman, Ehlers, Wichman, Weaver, & Coddington, (2011), one hundred and sixty two couples that presented for IVF treatment were examined. The study focused on comparing the psychological distress among men and women who were preparing for IVF treatment. Results showed that women were found to have higher levels of depression and state anxiety than men. Another study which focused on the relationship between coping and depression among men and women referred for IVF also reported higher levels of depression for women than men (El Kissi et al., 2013). A study done by Reis et al. (2013) examined the levels of depression and anxiety exhibited by infertile men and women undergoing all types of Assisted Reproductive Techniques. The results showed that scores of depression were significantly higher for women than for men in the sample. A significant level of state anxiety was found in both men and women (Reis et al., 2013). The present research was concerned with partial replication in examining the levels of depression and state anxiety in infertile men and women undergoing specifically two Assisted Reproductive Techniques; IVF and ICSI treatment (not all types of ART in the case of Reis et al., 2013). Furthermore, the study by Reis et al. (2013) didn't specify whether patients had

primary or secondary infertility as the present study did. Moreover, it was done in Portugal and did not take into consideration which partner was responsible for infertility. This study targeted infertile men and women in Lebanon with attention centering on responsibility for infertility.

Infertility not only affects each individual as previously mentioned, it also affects the couple's relationship as a whole. The couple may either distance themselves from each other or form a stronger bond to deal with their problem. Results of a 20 year longitudinal study based on 514 couples in Sweden showed that their relationship was found to remain good and the couple stayed together regardless of whether they had become parents or not; although a side note was that the majority of the IVF couples which made up around 91 percent of the sample had added at least one biological or adopted child to their family prior the follow up (Sydsjö, Svanberg, Bladh, & Lampic, 2014). Infertility seems to affect marital satisfaction if the couples undergoing IVF treatment have had prior psychological disorders; however if the couples are "healthy", then marital satisfaction does not seem to be affected (Shakeri, Hossieni, Golshani, Sadeghi, & Fizollahy, 2006). A meta-analysis done by Tao, Coates & Maycock in 2012, investigated the marital relationship in infertility between men and women. Of the potential 794 articles searched for, only 18 articles were included in the final analysis of the study. This meta-analysis found very few studies that examined the relationship between male infertility and marital relationship. The results of those studies showed that infertile males expressed more marital satisfaction than their partners. As for female infertility and marital relationship, many studies were found. The results of those studies showed that infertile women had lower marital satisfaction levels when compared to their partners or to

fertile females. According to the meta-analysis, the findings concerning infertility and marital relationship among the couples need further studies (Tao et al., 2012). Moreover, because none of the studies conducted took into consideration the male factor, female factor, and a combination of both male and female factors in infertility, future studies related to infertility and marital satisfaction must be explored. This study focused on the marital satisfaction of both infertile men and women taking into consideration which partner was responsible for infertility. It specifically focused on the marital satisfaction of couples with primary infertility undergoing IVF and ICSI treatment in Lebanon.

1.4 Significance of the Study

Infertility is one of the most stressful conditions couples go through and with the high rate of couples being unable to conceive "in vivo", IVF and ICSI are becoming the main treatments for infertility in Lebanon. Studies have focused on the experience of infertility among only women with regard to depression and anxiety levels, and very little focus has been examined among men (El Kissi et al., 2013). The importance of this study was that it examined the depression levels, state anxiety levels, and marital satisfaction levels of infertile couples undergoing IVF and ICSI treatment with regard to who was responsible for the infertility. There is a lack of conclusive research in the area of the different psychological aspects of infertility between genders mainly because studies have not focused on which gender was the cause of infertility. In other words, a male whose wife was infertile would possibly be less psychologically affected than if he was infertile himself. Hence this study took into consideration each partner's responsibility concerning their inability to conceive. This study is different from other studies done because it is specifically representative of the Lebanese population of infertile couples who are seeking IVF/ICSI treatment which has not

been done before. This study will contribute to increasing awareness of the important psychological experiences infertile couples undergo. Understanding the psychological experiences and how responsibility and gender play a role as well as how they affect marital satisfaction can reduce dropout rates of couples who undergo In Vitro Fertilization and Intra Cytoplasmic Sperm Injection treatment. Furthermore, it can create awareness of the necessity of involving a psychologist in the IVF and ICSI treatment team in Lebanon similar to other infertility treatment units abroad such as in Canada and Britain which have implemented this.

1.5 Statements of the Hypotheses

Since there have been mixed findings concerning the emotional status (anxiety and depression) of couples in the treatment of IVF/ICSI and the focus on who was the cause of infertility has not been studied, this study compared the psychological impact of IVF and ICSI treatment in infertile couples based on who was responsible for the infertility as well as assessed the overall marital satisfaction levels of the couple undergoing IVF/ICSI treatment. In the current study, the following was tested:

Past literature has focused on how ART treatments affect men and women. Women exhibited higher depression levels than men while both men and women exhibited similar state anxiety levels. When the cause of the infertility is taken into consideration in IVF and ICSI treatment specifically, depression levels and state anxiety levels among genders may differ.

H1: Men who are responsible for the infertility will have higher levels of depression and also higher levels of state anxiety than men who are not responsible for the infertility.

H2: Women who are responsible for the infertility will have higher levels of depression and also higher levels of state anxiety than women who are not responsible for the infertility.

H3: The overall levels of depression for all the women in the sample will be higher than the overall levels of depression for all the males in the sample.

Very few studies were done concerning the relationship between marital satisfaction and male infertility. Studies that examined the relationship between marital satisfaction and female infertility showed lower levels of marital satisfaction when compared to fertile females or to their partners. None of the studies done took into consideration who was the cause of the infertility with respect to the overall marital satisfaction level. This is crucial because the level of overall marital satisfaction among couples may differ whether the male, the female, or both partners are responsible for the infertility.

H4: The overall level of marital satisfaction for the infertile couples will be lower for couples where the female was responsible for the infertility than where the male was responsible for the infertility.

H5: The overall level of marital satisfaction for the infertile couples will be higher for couples where both partners were responsible for the infertility than where either partner was responsible for the infertility.

1.6 Overview of Methodology

The sample of this study was composed of couples aged 30 to 45 diagnosed with primary infertility seeking IVF/ICSI treatment. The sample consisted of 60 couples divided into three groups. The first group involved 20 couples undergoing IVF treatment (female infertility). The second group involved 20 couples undergoing ICSI treatment (male

infertility). The third group involved 20 couples undergoing IVF/ICSI treatment (combined infertility). A consent form was provided to be signed by the participants. A demographic & clinical data form was provided to the participants to get the necessary background information of the sample. The Beck Inventory Depression II (BDI-II) was used to assess the levels of depression of the participants. The State Anxiety Inventory-Form Y was used to assess the current anxiety of the participants. Finally, the Index of Marital Satisfaction (IMS) was used to assess the quality of the marital relationship as a whole. The couples were told about the purpose of my study & asked if they would like to participate while waiting for their turn in the IVF/ICSI clinic. The couples that agreed to participate were directed to an empty room where each was given the consent form (confidentiality) to sign & the questionnaires to be filled out individually. After completion, the couples placed them in a sealed envelope & inserted the envelope into a box in the room.

In summary, this study intended to focus on the depression levels and state anxiety levels exhibited by the infertile couples undergoing IVF/ICSI treatment in Lebanon. The focus was on couples whose infertility was caused by the man, couples whose infertility was caused by the woman and couples whose infertility was caused by both partners. Men and women responsible for infertility were compared on levels of depression and state anxiety to men and women not responsible for infertility. Genders were compared with respect to depression levels. Furthermore, the overall marital satisfaction levels of the infertile couples were examined to view how IVF and ICSI treatment has affected their marital lives.

CHAPTER TWO

Review of Literature

This chapter explains infertility in more detail. It discusses the normal process of conception, an evaluation of the couples seeking treatment, and the possible causes of infertility. It further discusses the treatment options available for both infertile men and women. It will end with the psychological impact of infertility and its treatment has on men, women, and the couple as a whole. This is important to further understand why and how infertility treatment affects infertile men and women.

2.1 Infertility

According to the World Health Organization and the International Committee for Monitoring Assisted Reproductive Technology, infertility can be defined as "the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse (Reis et al., 2013; Khetarpal & Singh, 2012). Infertility is considered sometimes as a "disease of the reproductive system" due to its "medicalization" (Khetarpal & Singh, 2012). Having a healthy reproductive system is considered one of the rights of an individual to reproduce. Medically, infertility results from a physical impairment or "an abnormality" in the reproductive system of males or females (Khetarpal & Singh, 2012; Jose-Miller, Boyden, & Frey, 2007). Males may have sperm dysfunction which relates to a low sperm count, slow motility, or abnormality in shape (Khetarpal & Singh, 2012). Females may have ovarian dysfunction such as failure to ovulate or tubal factors such as blocked fallopian tubes (Abu-Rabia, 2013; Jose-Miller et al, 2007; Khetarpal & Singh, 2012). As previously mentioned in

chapter one, the causes of infertility cannot always be found known as "unexplained infertility" (Jose-Miller et al, 2007). In adulthood, becoming a parent is one of the most basic and desired goals of couples. This is why infertility is not only a physical problem; it has a psychological impact on individuals as well (Sharma, Mittal, & Aggarwal, 2009). Moreover, infertility also poses a threat to the marital relationship as a whole because of the unmet dream to procreate (Khetarpal & Singh, 2012). Hence, medical intervention has become a necessity for infertile couples (Sharma et al., 2009; Khetarpal & Singh, 2012).

2.2 The Process of Conception

In order to understand the causes and treatments of infertility, it is important to understand how pregnancy occurs naturally. During ovulation, a woman's ovary releases an egg which is picked up by the fallopian tube. Sperm from the man travels through the vagina, into the uterus, and up into the fallopian tube where it fertilizes the egg. After the egg is fertilized (known as an embryo), it travels after 2-3 days from the fallopian tube down to the uterus where implantation occurs (see Appendix VIII, Figure 2.1 for normal conception process). When a problem occurs in any part of this process, it leads to infertility and medical evaluation (American Society for Reproductive Medicine, 2012).

2.3 Evaluation of Infertility

Couples seek medical evaluation when a pregnancy has not been achieved after 12 months or more of regular unprotected sexual intercourse (Jose-Miller et al, 2007; Jose-Miller et al, 2007). Females who are 35 years and older may seek evaluation because fertility, miscarriage and chromosomal abnormality increase with maternal age (Sharma et al., 2009). During the evaluation process, couples are evaluated together and then separately because there may be some information (like a previous pregnancy or a sexually transmitted disease)

which an individual wants to keep private. An accurate analysis can be made when a personal and medical history is collected from the couple (Jose-Miller et al, 2007). Mainly, what is addressed during the couple's evaluation involves the duration of infertility, history of previous infertility, frequency of intercourse, timing of intercourse, and the use of products that may impair fertility (Jose-Miller et al, 2007; Sharma et al., 2009). For both partners, a full laboratory blood test, history of medication and substance use is also checked for (Jose-Miller et al, 2007). Then each partner is evaluated separately to understand the cause of the infertility. Below is a detailed explanation of all the male and female factors that contribute to infertility. The importance of the below mentioned factors allows for a better understanding of the difficulties infertile men and women undergo. Knowing the factors that contribute to infertility provides a wider understanding of the treatment options. Sometimes, a mixture of treatments is used in infertile couples such as in IVF/ICSI procedures where hormone therapy is provided before for women and sometimes vitamins for men. Moreover, an understanding of the causes can contribute to helping psychologists support and validate the emotions of infertile patients seeking IVF/ICSI treatment. This understanding could also contribute to prevention methods in lowering chances of infertility.

Male Infertility:

A. Pre-Testicular Factors: Factors that affect the testes and create poor hormonal and general health conditions such as drugs, alcohol, cigarette smoking, and strenuous activities (Olooto, 2012; Jose-Miller et al, 2007).
B. Testicular Factors: Factors that affect the quantity and quality of the semen produced by the testes. This includes age, genetic defects and viral infections such as mumps (Olooto, 2012; Jose-Miller et al, 2007).

C. Hypothalamic-Pituitary Factors: Factors that affect the hypothalamo-pituitary axis (HPA) such as hyperprolactinemia (an elevated level of prolactin) which may cause erectile dysfunction, decrease libido and infertility (Olooto, 2012; Jose-Miller et al, 2007).

D. Environmental Factors: Men who are exposed to chemicals such as glues, silicones, radiations and excessive heat have a higher chance of having primary or secondary infertility as these chemicals have a damaging effect on the testicles (Olooto, 2012; Jose-Miller et al, 2007).

E. Lifestyle: Alcohol intake and tobacco smoking can cause damage that is irreversible. Tobacco smoking is highly damaging to the sperm of men and also decreases the levels of antioxidants such as vitamin C and E causing oxidative damage to the spermatozoa. Men who smoke have a 60% higher chance of having infertility than men who do not smoke (Olooto, 2012; Jose-Miller et al, 2007).

F. Sexually Transmitted Disease (STD): STDs are the main cause of infertility and due to their asymptomatic nature; proper treatment is not seeked in time to prevent infertility (Olooto, 2012; Jose-Miller et al, 2007).

G. Urinary Tract Infection: Some men may have infections in their urinary tract which may lead to fertility problems (Olooto, 2012; Jose-Miller et al, 2007).

H. Structural Obstruction: Certain obstructions in the genitals of men can be a cause of infertility as it affects ejaculation (Olooto, 2012; Jose-Miller et al, 2007).

I. Spermatozoa: The quality and quantity of the spermatozoa of men is very important in infertility. A low sperm count, an abnormal shape, or low sperm motility can all be a cause of infertility in men (Olooto, 2012; Jose-Miller et al, 2007).

J. Microorganisms: Certain microbial infections in men can lead to a decrease in their sperm count and impairment in their sperm motility (Olooto, 2012; Jose-Miller et al, 2007).

K. Chemotherapy: Men undergoing a series of chemotherapy sessions can result in infertility with each series performed (Olooto, 2012; Jose-Miller et al, 2007).

Female Infertility:

A. Environmental Factors: Toxins such as glues and harmful environmental exposure have been found to be linked to spontaneous miscarriage in women. Therefore, women who have direct contact to such harmful chemicals have a high chance of having primary or secondary infertility (Olooto, Amballi, & Banjo, 2012; Jose-Miller et al, 2007).

B. Weight Changes: Nutrition is very important for fertility and excessive weight loss or weight gain can affect conception. Women with excessive weight gain having a body mass index (BMI) greater than 27 have a higher chance of ovarian dysfunction (problems with ovulation). Excess weight also affects the outcome of infertility treatment. Fat cells and the primary sex organs increase estrogen production in obesity which hinders pregnancy because the body interprets this increase in estrogen as birth control. Women with too little body fat causes low estrogen production levels which creates irregular menstrual cycles with no ovulation (Olooto, et al., 2012; Jose-Miller et al, 2007).

C. Age: As women progress in age fertility declines. At the ages of 18 to 24 years, female fertility is at its peak; by age 27, fertility begins to decline; by 35 and onwards, fertility drops at a greater rate. Ovarian reserve in women at age 30 is 12% and by 40 is only

3%. Approximately 81% of changes in ovarian reserve are caused by age alone, which makes age the most vital cause of infertility in women (Olooto, et al., 2012; Jose-Miller et al, 2007).

D. Life Style: Habits such as smoking tobacco/cannabis and alcohol consumption affect infertility. Women who smoke have a 60% chance of being infertile when compared to non-smokers (Olooto, et al., 2012; Jose-Miller et al, 2007).

E. Hormonal Imbalance: Hormonal imbalance affects ovulation of women in the sense that not enough follicles will be produced to develop an ovule. Stress can cause a hormonal imbalance by affecting the hypothamamo-pituitary-adrenal (HPA axis) mainly increasing the prolactin level (Olooto, et al., 2012; Jose-Miller et al, 2007).

F. Hyperprolactinemia: Is when women experience abnormally high levels of prolactin in their blood. Hyperprolactinemia increases the release of dopamine from the hypothalamus which eventually causes infertility (Olooto, et al., 2012; Jose-Miller et al, 2007).

G. Ovarian Problems: Ovarian dysfunction results when there is an absence of eggs in the ovaries (ovarian failure), a blockage of the ovaries, physical damage by surgery or radiation, multiple cysts on the ovaries (endometriosis), and polycystic ovaries (PCOS). PCOS does not allow for ovulation in the women's cycle and is usually hereditary. In PCOS, there is a high level of androgen produced which increases the luteinizing hormone (LH) and decreases the levels of the follicle-stimulating hormone (FSH) which prevents follicles from producing a mature egg (Olooto, et al., 2012; Jose-Miller et al, 2007).

H. Tubal Factors: Tubal problems involve endometriosis; a condition where the tissue that lines the uterus develops outside of the uterus in places such as the ovaries and fallopian tubes which prevent the transfer of the egg to the tube, causing infertility (Olooto, et al., 2012; Jose-Miller et al, 2007).

I. Uterine Factors: Infertility can be caused due to uterine factors such as an abnormal uterine shape and fibroids (noncancerous tumor of the muscle tissue) in the uterus which may impair the uterine lining, block the fallopian tubes, distort the shape of the uterine cavity, or change the position of the cervix (Olooto, et al., 2012; Jose-Miller et al, 2007).

J. Thyroid Problems: When there are problems in the thyroid, there is an increase in the risk of prematurity or stillbirth. Thyroid problems in women of reproductive age can be associated with irregular menstrual cycles which may affect conception (Olooto, et al., 2012; Jose-Miller et al, 2007).

K. Sexually Transmitted Disease (STD): STDs are a main cause of infertility affecting tubal factors and due to their asymptomatic nature; proper treatment is not seeked in time before fertility decreases (Olooto, et al., 2012; Jose-Miller et al, 2007).

L. Chemotherapy: Women undergoing a series of chemotherapy sessions can result in infertility as the follicle count decreases with each series performed (Olooto, et al., 2012; Jose-Miller et al, 2007).

2.4 Treatment Options for Infertility

The treatment options for infertility depend on who is responsible for infertility; whether it is a male factor, female factor, or both.

A. Treatment for the male factor infertility can involve antibiotic therapy for men with infection, surgical correction of problems in the genitals (varicosities), medications to improve sperm production (hormone treatment and vitamins), or surgery to acquire sperm from the testis (in case of azoospermia a testicular biopsy is done). When there is no apparent cause as to why the man has poor sperm quality, Assisted Reproductive Technology such as Intrauterine Insemination (IUI), In Vitro Fertilization (IVF) or Intra Cytoplasmic Sperm Injection (ICSI) can be performed. Intrauterine Insemination (IUI) is the process where the sperm of a man is injected directly into the uterus of the woman (skipping the cervix) where it can be closer to the egg for fertilization. A semen sample is provided by the man in this procedure. The semen is washed to increase sperm motility and concentration and to remove any chemicals/fluids that may irritate the uterus of the woman. IVF and ICSI were explained in detail in chapter one. When no sperm at all can be found in the semen sample, a testicular biopsy is done to check if spermatozoa can be found in the testes. If none is found, a sperm donor is an option (Olooto, 2012; American Society for Reproductive Medicine, 2012; Jose-Miller et al, 2007; Greil et al., 2010).
B. Treatment for female factor infertility can involve certain drugs/hormones to induce ovulation for ovulation problems (anovulation), antibiotics for cervical problems, or surgery for women with blocked/damaged tubes, uterine problems, or endometriosis. Other options involve fertility drugs with Assisted Reproductive Technology like Intrauterine Insemination (IUI) or In Vitro Fertilization (IVF). In worst cases (ovarian failure or poor quality of the ova), egg donation is an option which is a process whereby eggs from a donor are fertilized with the sperm of the man in a dish at the lab.

The resulting embryo will then be transferred into the uterus of the woman. The woman will not be related biologically to the child contrary to the man, but she will be the birth mother on record (Olooto, et al., 2012; American Society for Reproductive Medicine, 2012; Jose-Miller et al, 2007; Greil et al., 2010).

2.5 The Psychological Impact of Infertility

Psychologically, infertility is considered to be a great stressor and trauma for most couples (El Kissi et al., 2013; Ramezanzadeh et al., 2004). Studies have shown that infertile women have higher distress levels than women who are not infertile (Wichman et al., 2011; Greil et al., 2010). According to Greil et al. (2010), infertile women display higher levels of depression and anxiety than women who have conceived naturally. Most studies have concluded that infertility for women is more distressing than for men (Greil et al., 2010). Infertility is associated with higher distress levels in developing countries than in developed countries because in the latter, voluntary childlessness is more socially acceptable. In developing countries, men and women with fertility problems refrain from labelling themselves as infertile because it affects their identities in society (Greil et al., 2010). Having a child is "expected" and when couples are unable to bear one, their social status lowers in society. Hence, a psychological burden is held by the couple when pregnancy is not achieved (Abu-Rabia, 2013). In Middle Eastern communities such as Egypt, women are blamed for infertility even if the cause is from the man because infertility is shaped by patriarchy "the degree of male dominance" in that society (Reis et al., 2013; Abu-Rabia, 2013; Greil et al., 2010). Men feel a threat to their masculinity with the inability to continue the patrilineal family line (Abu-Rabia, 2013). Moreover, infertility can create problems between the couple

due to its stressful nature causing marital dissatisfaction (Khetarpal & Singh, 2012; Ramezanzadeh et al., 2004).

A study done by Reis et al (2013) in Portugal compared the depression levels and state/trait anxiety levels of couples undergoing Assisted Reproductive Techniques (ART) for the first time with couples undergoing Assisted Reproductive Techniques repeatedly. The sample was composed of couples undergoing all types of ART treatment with no specification as to who was responsible for the infertility. There were two groups; group one comprised 43 couples undergoing ART treatment for the first time and group two consisted of 46 couples undergoing repeated ART treatments. The couples were seen together the first time for general data collection and then seen separately for the psychological assessment. Couples knew about their infertility diagnosis prior to the psychological assessment. The psychological assessment involved a demographic and clinical information sheet, the Beck Depression Inventory II (BDI-II), and the State-Trait Anxiety Inventory-Form Y (STAI-Y). Informed consent was filled out by all the participants before data collection. All couples participated prior to starting their ART treatment, whether for the first time or not. Results showed that couples undergoing ART treatment for the first time had lower depression levels than couples undergoing ART repeatedly which means that more ART treatments increases depressive symptoms. Furthermore, results showed that couples undergoing ART treatment for the first time had higher state anxiety levels than couples undergoing ART repeatedly which means that knowing more about the medical procedures and techniques can decrease immediate anxiety. When examining gender differences, the results further showed that in both groups, women experienced significantly higher levels of depression than men consistent with the literature that suggests that most infertile women show higher levels of depressive symptoms than men.

The results also showed that both men and women in both groups had high levels of state anxiety compared to their levels of trait anxiety suggesting that both genders experience feelings of anxiety even if men tend to be less expressive in communicating their feelings (Reis et al., 2013). Another study by Wichman et al. (2011) compared the psychological distress levels between men and women preparing for IVF treatment. The study was a retrospective study which received approval from the International Review Board. The sample was composed of 162 couples presenting to Mayo Clinic from 2005 – 2008. Before proceeding with IVF treatment, all patients were evaluated through a clinical interview and psychometric assessment. The psychometric assessment involved the Beck Depression Inventory, State-Trait Anxiety Inventory, State-Trait Anger Inventory, Impact of Events Scale, and Perceived Stress Scale. Participants were married white couples with a mean age of 32.7 for women and 35.1 for men. The results showed the both infertile men and women experience a significant level of psychological distress when undergoing IVF. However, as supported by previous research, women showed higher levels of psychological distress in certain areas than men. Both of these studies examined psychological distress levels (depression and anxiety) among genders undergoing ART treatment. However, none took into consideration which gender was responsible for infertility.

Infertility and its treatment not only affect men and women individually, but also affect the overall marital satisfaction level of the couple. A study by Drosdzol & Violetta (2009) evaluated the effect of infertility on marital satisfaction in Poland. The study involved a comparison of infertile couples with fertile couples on many variables among which included marital satisfaction. The study involved participants aged between 20 and 45 seeking treatment. The sample consisted of 206 infertile women and 188 infertile men. The

comparison group (fertile sample) consisted of 190 fertile couples. The measures involved a socio demographic form and the Index of Marital Satisfaction questionnaire. The results showed that the overall level of marital functioning was better among couples seeking infertility treatment than fertile couples. This could be due to the effective communication and emotional support infertile couples need to pursue treatment. Furthermore, the study showed that infertile couples seeking treatment showed less problems in interaction within the marriage than the fertile group. However, infertile women were more susceptible to marital stress than their male partners in line with previous research.

It is clear now that infertility and its treatment have many psychological implications on both men and women individually, as well as the overall level of marital satisfaction of the couple. A better understanding of the causes of infertility, the treatment options available and the psychological impact of infertility and its treatment are essential for providing better care to the patients..

CHAPTER THREE

METHOD

This chapter explained the methodology used in conducting this study. It included details of the sample chosen, the materials provided with details of what each material tested, and the procedure of how participants were approached and asked to fill the questionnaires.

3.1 Sample

The sample of this study was composed of couples diagnosed with primary infertility whose only option of treatment was IVF or ICSI; meaning couples where women have blocked tubes (female tubal factor causing infertility) and couples where men have very low sperm functions (male infertility). The sample was divided into three groups and involved 60 couples. The first group included 20 couples undergoing IVF treatment where the problem of infertility related to the woman. The second group included 20 couples undergoing ICSI treatment where the problem of infertility related to the man. The third group included 20 couples undergoing IVF/ICSI treatment where the problem of infertility related to both partners. The ages ranged from 30 to 45 and were collected from three infertility clinics in Beirut. These three clinics were chosen due to their well-known reputation in treating infertile couples and large amount of daily infertile patients coming for treatment. The social economic status of the sample was not taken into consideration in this study.

3.2 Materials

A consent form was provided to be signed by the participants (see Appendix I). A demographic and clinical data form was then provided to the participants in order to get the necessary background information of the sample. This involved 9 general background

questions about the participants to make sure they fit the criteria required in this study (see Appendix II).

The Beck Inventory Depression II (BDI-II) was used to assess levels of depression of the participants (see Appendix III). The BDI-II is a self-administered tool used to screen and assess the severity of depression in adolescents and adults. It consists of 21 items whose scores are grouped into three factors – cognitive, affective, and somatic. There is a four point scale for each item which ranges from 0 to 3. All scores for the 21 items are summed up to give a total depression score. Scores that are equal to or below 13 points indicate minimal symptoms of depression; scores from 14 to 19 points indicate mild depression; scores from 20 to 28 indicate moderate depression; and scores from 29-63 indicate severe depression.

The State Anxiety Inventory-Form Y was used to only assess the state anxiety of the participants. The State Anxiety Inventory Form consists of scales of 20 items that instructs the participants to choose the best option that describes the intensity of his/her feelings at that specific time (see Appendix IV). There is a four point scale for each item which ranges from 1 to 4. When scoring, all the positive items (anxiety absent items) are reversed. Then all the scores for the 20 items are summed up to give a total state anxiety level score. Scores range from 20 to 80 where the higher the scores, the greater the anxiety. A cut off of 39 – 40 indicates clinically significant state anxiety symptoms.

Moreover, the Index of Marital Satisfaction (IMS) was used to assess the quality of the relationship as a whole. The IMS consists of 25 items that measure the degree of satisfaction the participants have in their present marriage (see Appendix V). In scoring, the positively worded items are reversed and then all 25 items are summed up with the total being subtracted

by 25. Scores that are below 30 indicate satisfaction within the relationship. The higher the score, the more dissatisfaction there is in the relationship.

3.3 Procedure

The consent form and questionnaires were placed in separate pockets of folders. While couples were waiting for their turn in the IVF/ICSI clinic, I approached each couple and told them:

- "Good morning, my name is Lucy Mitri and I am a psychology master's student at Haigazian University. I am currently working on my thesis which involves understanding how infertility and its treatment are affecting your lives individually and as a couple. If you agree to participate in my study, I will be giving you four short questionnaires in English to fill out which will take around 15-20 minutes. You are under no obligation to participate in this study and should feel free to decline. No information that identifies you personally will be collected. Your participation will be anonymous and will be kept confidential. At the end of this study, the questionnaires will be shredded to ensure the confidentiality of your responses. Would you like to participate in this study?"

Sixty couples participated in this study where each couple was directed to an empty room. Each couple was provided with a separate consent form to sign with the demographic and clinical data form, the Beck Inventory Depression II (BDI-II), the State Anxiety Inventory-Form Y (SAI-Y) and the Index of Marital Satisfaction to be filled out individually. After completion of these questionnaires, the couple placed them in a sealed envelope and dropped it into a large box. This chapter explained the methods used in collecting the required data for

this study. The next chapter will present the results acquired using the above mentioned methodology.

CHAPTER FOUR

RESULTS

This study examined the psychological impact of In Vitro Fertilization and Intra Cytoplasmic Sperm Injection on infertile men and women in Lebanon. This chapter was divided into five sections and presents the data analysis conducted on SPSS 19. The first section reports the reliability of the questionnaires used in this study. The second section examines depression and state anxiety levels among men and women responsible and not responsible for infertility. The third section examines the depression levels between all men and women in the sample. Finally, the fourth section examines the overall level of marital satisfaction of each couple in terms which partner is responsible for infertility.

4.1 Reliability of Questionnaires

Using SPSS 19, the reliability levels of the Beck Depression Inventory II, the State Anxiety Inventory Form, and the Index of Marital Satisfaction questionnaire were examined in this study (see Table 4.1). A good reliability level was found in all three questionnaires and in line with previous reliability levels in the literature.

Table 4.1 – Reliability of Questionnaires (Cronbach's Alpha)

	Previous Research	**Present Study**
Beck Depression Inventory-II	0.84	0.84
State Anxiety Inventory Form	0.65 - 0.85	0.72
Index of Marital Satisfaction	0.90	0.82

4.2 Depression and State Anxiety Levels

Before conducting independent sample t tests for each questionnaire, a correlation between the BDI-II and the State Anxiety Inventory Form was conducted to make sure each questionnaire was measuring a different construct. Results showed that the correlation between the two questionnaires was 0.096 indicating no correlation.

Hypothesis one compared the levels of depression and state anxiety between males responsible for infertility and males not responsible. To compare the levels of depression, an independent t test was conducted. Results showed a significant difference between both groups, $t(58) = 3.80$; $p < 0.01$ (see Table 4.2). However, the mean scores for males responsible and males not responsible for infertility lied in the same category of "mild depression" which ranges from 14-19 according to the BDI-II. To further understand the difference between the two groups, an effect size was calculated between the two groups. A Cohen's d of 1.11 was found indicating a large effect size (larger than 0.80). To compare the levels of state anxiety, an independent t test was also conducted. Results showed a significant difference between both groups, $t(58) = 2.08$; $p < 0.05$ (see Table 4.2). There was a significant difference between the mean scores for males responsible and males not

responsible for infertility. To further understand the difference, an effect size was calculated between the two groups. A Cohen's d of 0.57 was found indicating a medium effect size (larger than 0.50).

Table 4.2 – Depression & State Anxiety Levels for Males

		N	Mean	Std. Deviation	t	Sig. (2 tailed)
Depression	**Males Responsible**	40	16.53	1.58	3.80	0.00
	Males Not Responsible	20	15.05	0.99		
State Anxiety	**Males Responsible**	40	37.98	2.60	2.08	0.04
	Males Not Responsible	20	36.50	2.56		

Hypothesis two compared the levels of depression and state anxiety between females responsible for infertility and females not responsible. To compare the levels of depression an independent sample t test was conducted. Results showed a significant difference between both groups, $t(58) = 9.99$; $p < 0.01$ (see Table 4.3). Females responsible had a higher mean score than females not responsible indicating a significant difference between the two groups. Females responsible for the infertility lied in the category of "moderate depression" which ranges from 20-28 according to the BDI-II. Females not responsible for the infertility lied in the category of "mild depression" which ranges from 14-19 according to the BDI-II. To further understand the difference, an effect size was calculated between the two groups. A Cohen's d of 2.74 was found indicating a very large effect size (larger than 0.80). To compare the levels of state anxiety in females, an independent sample t test was also conducted. Results showed a marginal significant difference between both groups, $t(58) = 2.01$; $p = 0.05$ (see

Table 4.3). Females responsible for infertility had a higher mean than females not responsible for infertility indicating a marginally significant higher level of state anxiety. To further understand the difference between the two groups, an effect size was calculated.. A Cohen's d of 0.52 was found indicating a medium effect size.

Table 4.3 – Depression & State Anxiety Levels for females		N	Mean	Std. Deviation	t	Sig. (2 tailed)
Depression	**Females Responsible**	40	23.53	1.69	9.99	0.00
	Females Not Responsible	20	18.90	1.68		
State Anxiety	**Females Responsible**	40	38.73	1.71	2.01	0.05
	Females Not Responsible	20	37.70	2.15		

4.3 Depression Levels between Genders

Hypothesis three compared the levels of depression between males and females in the sample. To compare the levels of depression, an independent sample t test was conducted. Results showed that there was a significant difference between both genders, $t(94) = 14.49$; $p < 0.01$. Overall, the mean of the females was higher than the mean of the males indicating a significant difference between the two genders. Females lied in the category of "moderate depression" which ranges from 20-28 according to the BDI-II while males lied in the category of "mild depression" which ranges from 14-19 according to the BDI-II. To further understand the difference, an effect size was calculated between the two groups. A Cohen's d of 2.65 was found indicating a very large effect size (larger than 0.80).

4.4 Overall level of Marital Satisfaction

Hypothesis four and five compared the overall level of marital satisfaction between couples where females were responsible, couples where males were responsible, and couples where both genders were responsible for infertility. To measure the overall level of marital satisfaction for each couple, each couples individual scores of the Index of Marital Satisfaction (IMS) were added together. According to the IMS, the higher the score, the less satisfied the couple in the relationship. A one way ANOVA and post-hoc test was conducted on SPSS 19. Results revealed a significant difference in the overall level of marital satisfaction between the couples of all three groups (see Table 4.4). Couples where females were responsible for infertility had the lowest marital satisfaction levels (highest IMS scores), followed by couples where males were responsible, and the highest marital satisfaction levels were found in couples where both partners were responsible for infertility (see Figure 4.1). Three correlations were computed between the three groups in terms of the IMS scores to make sure that adding each couple's IMS score was representative of their overall marital satisfaction level. A correlation of 0.71 was found between the IMS scores of each couple where the females were responsible. A correlation of 0.74 was found between the IMS scores of each couple where males were responsible. A correlation of 0.80 was found between the IMS scores of each couple where both partners were responsible for the infertility. These correlations reflect a similarity in IMS scores between partners and imply that adding the scores was representative of the overall level of marital satisfaction among couples.

Table 4.4 - IMS Scores for the Three Couple Groups

Responsibility	N	Mean	Std. Deviation	F	Sig. (2 tailed)
Females Responsible	20	47.75	3.02	*15.42*	0.00
Males Responsible	20	44.80	2.78		
Both Responsible	20	41.80	4.18		

Couple's responsibility	Couple's responsibility	Sig.
Male Responsible	Female Responsible	0.021
Female Responsible	Both Responsible	0.000
Both Responsible	Male Responsible	0.019

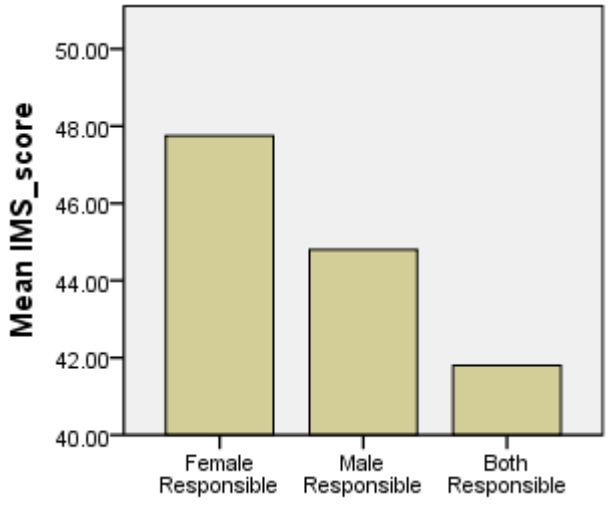

Figure 4.1- IMS Scores for the Three Couple Groups

4.5 Additional Findings

To further analyze the data collected between infertile men and infertile women, independent t tests were conducted between couples. In other words, depression levels, state anxiety levels, and marital satisfaction levels were compared between couples. The first t test was conducted between couples where the male was responsible for the infertility (see Table 4.5). A significant difference was found between men and women on levels of depression and levels of marital satisfaction ($p < 0.01$). Results indicate that even when the men were responsible for infertility, women experienced higher levels of depression and lower levels of marital satisfaction than their partners. However, no significant difference was found between men and women on levels of state anxiety ($p > 0.05$).

Table 4.5 – Couple comparisons where males are responsible for infertility

		N	Mean	Std. Deviation	t	Sig. (2 tailed)
Depression	**Males Responsible**	20	16.45	1.57	4.76	0.00
	Females Not Responsible	20	18.90	1.68		
State Anxiety	**Males Responsible**	20	37.95	2.70	0.32	0.75
	Females Not Responsible	20	37.70	2.15		
Marital Satisfaction	**Males Responsible**	20	20.85	1.35	6.54	0.00
	Females Not Responsible	20	23.95	1.64		

The second t test was conducted between couples where the female was responsible for the infertility (see Table 4.6). A significant difference was found between men and women on levels of depression, state anxiety and marital satisfaction ($p < 0.01$). Results indicate that

women experience higher levels of depression, higher levels of state anxiety, and lower levels of marital satisfaction than their partners when they are responsible for infertility.

Table 4.6 – Couple comparisons where females are responsible for infertility		**N**	**Mean**	**Std. Deviation**	**t**	**Sig. (2 tailed)**
Depression	**Males Not Responsible**	20	15.05	0.99	19.82	0.00
	Females Responsible	20	23.05	1.50		
State Anxiety	**Males Not Responsible**	20	36.68	2.50	3.88	0.00
	Females Responsible	20	39.25	1.55		
Marital Satisfaction	**Males Not Responsible**	20	21.25	1.80	10.09	0.00
	Females Responsible	20	26.50	1.47		

The third t test was conducted between couples where both males and females were responsible for the infertility (see Table 4.7). A significant difference was found between men and women on levels of depression only ($p < 0.01$). However, no significant difference was found between men and women on levels of state anxiety and levels of marital satisfaction ($p > 0.05$). Results indicate that when both partners are responsible for infertility, women experience significantly higher levels of depression than their partners, but no significant differences in levels of state anxiety and marital satisfaction.

Table 4.7 – Couple comparisons where both partners are responsible for infertility

		N	Mean	Std. Deviation	t	Sig. (2 tailed)
Depression	**Males Responsible**	20	16.60	1.64	13.70	0.00
	Females Responsible	20	24.00	1.77		
State Anxiety	**Males Responsible**	20	38.00	2.58	0.29	0.78
	Females Responsible	20	38.20	1.74		
Marital Satisfaction	**Males Responsible**	20	20.35	2.06	1.38	0.17
	Females Responsible	20	21.30	2.30		

The results presented above indicated a clear difference between the levels of depression and the levels of state anxiety among infertile men and women undergoing IVF/ICSI treatment with respect to who is responsible for infertility. Moreover, a significant difference was found between the overall depression levels among genders irrespective of responsibility of infertility. Finally, the overall level of marital satisfaction among couples significantly differed according to which partner was responsible for infertility. The additional findings further provided an understanding of the impact of infertility treatment on each partner according to responsibility. A more detailed discussion and summary of the findings are presented in the next chapter.

CHAPTER FIVE

DISCUSSION AND SUMMARY

The main purpose of this study was to understand the psychological impact of In Vitro Fertilization and Intra Cytoplasmic Sperm Injection treatment on men and women with respect to which partner was responsible for infertility. This study was conducted to either accept or reject five hypotheses mentioned in chapter one. Three of the hypotheses involved differences in depression and state anxiety levels of the infertile individuals while the remaining two hypotheses involved the overall level of marital satisfaction among infertile couples. All five hypotheses were supported. This final chapter involves a restatement of the hypotheses mentioned in chapter one, a discussion of the results found as well as the possible limitations of this study.

The first hypothesis stated that men responsible for infertility would have higher levels of depression and higher levels of state anxiety than men not responsible for infertility. A correlation between the BDI-II and the State Anxiety Inventory form was conducted to make sure both instruments were not measuring the same construct. No correlation was found between the two tests. A t test was conducted between men responsible for infertility and men not responsible for infertility in terms of depression levels. Results indicated higher levels of depression for men responsible than men not responsible for infertility. Although according to the BDI-II, both groups experienced “mild depression”, the results indicated the difference to be significant with a large effect size. There have not been similar studies conducted to support this finding; however this finding is in line with previous research concerning the levels of depression men experience. Previous research mentioned that infertile men do

experience mild levels of depression. Another t test was conducted between men responsible for infertility and men not responsible for infertility in terms of state anxiety levels. Results indicated that men responsible for infertility had higher levels of state anxiety than men not responsible for infertility. According to the means, both groups did not reach the cut off score of 39-40 which indicates a clinically significant level of state anxiety, but the difference between the groups was significant with a medium effect size. There have not been similar studies conducted to support this finding; however this finding is in line with previous research which indicates that infertile men do experience moderate levels of state anxiety although they do not express it. Therefore, hypothesis one was supported and a significant difference was found between men responsible for infertility and men not responsible for infertility in terms of depression and state anxiety levels.

The second hypothesis stated that women responsible for infertility would have higher levels of depression and higher levels of state anxiety than women not responsible for infertility. A t test was conducted between women responsible for infertility and women not responsible for infertility in terms of depression levels. Results indicated that women responsible for infertility had higher levels of depression than women not responsible for infertility. The results indicated that the difference between the two groups was highly significant (effect size was very large). Women responsible for infertility experienced "moderate depression" while women not responsible experienced "mild depression". There have not been similar studies conducted to support this finding; however this finding is in line with previous research concerning the levels of depression women experience. Previous research mentioned that infertile women experience high levels of depression without taking

into consideration responsibility. Hence, the results of this study could be understood by the role of "motherhood" required of women. Not being able to bear a child regardless of who the cause is induces depressive symptoms; therefore being the cause of this infertility can highly increase depressive symptoms. Another t test was conducted between women responsible for infertility and women not responsible for infertility in terms of state anxiety levels. Results indicated that women responsible had higher levels of state anxiety than women not responsible for infertility. According to the means, both groups did not reach the cut off score of 39-40 which indicates high levels of state anxiety, but the difference between the groups was marginally significant with a medium effect size. There have not been similar studies conducted to support this finding; however this finding is in line with previous research which indicated that infertile women do experience levels of state anxiety. This marginal significance could be understood through the process of treatment women go through regardless of who holds responsibility for infertility. IVF/ICSI treatments are stressful and require similar steps for the women whether undergoing an IVF procedure or an ICSI procedure (regardless of which partner is the cause). Therefore, hypothesis two was supported and a significant difference was found between women responsible for infertility and women not responsible for infertility in terms of depression and state anxiety levels.

The third hypothesis stated that the overall levels of depression for women in the sample would be higher than the levels of depression for the men. A t test was conducted between genders in terms of depression levels. Results indicated that the women had significantly higher levels of depression than the men. The effect size was very large and according to the ratings on the BDI-II, women experienced "moderate depression" while men

experienced “mild depression”. This result is in line with previous research which indicated that infertile women experience higher levels of depression than men. In this case, the high depression levels in infertile women could be contributed to many factors. First, women have to fill the social role of motherhood and when this role cannot be achieved, a woman’s identity is lost. Second, according to previous literature in Middle Eastern societies, even if the problem is a male factor, women are blamed for the inability to conceive. Moreover, the IVF/ICSI treatment is very stressful physically and emotionally on women. The women are the ones who go through the procedure and feel responsible if a failure to conceive results. Men, on the other hand, feel a threat to their manhood which could explain the mild depressive symptoms experienced. Furthermore, IVF/ICSI treatments are costly, so a failure could be a disappointment economically as well. Therefore, hypothesis three was supported and a significant difference was found between the women and the men in the sample in terms of depression levels.

The fourth and fifth hypothesis discussed the overall level of marital satisfaction among couples with respect to which partner holds responsibility for infertility. The fourth hypothesis stated that the overall level of marital satisfaction for infertile couples would be lower for couples where women were responsible for infertility than where men were responsible for infertility. The fifth hypothesis stated that the overall level of marital satisfaction for the infertile couples would be higher for couples where both partners were responsible than where either partner was responsible for infertility. Results indicated a significant difference between the overall levels of marital satisfaction for all three groups; couples where women were responsible, couples where men were responsible, and couples

where both partners were responsible for infertility. Couples where women were responsible for infertility had the lowest marital satisfaction levels (IMS scores were the highest) than when the men were responsible for infertility. This could be explained by women being more understanding and supportive of their husbands when the problem is a male factor than when it's a female factor. This is in line with previous research which indicated that infertile women are more susceptible to marital stress than their male partners and that infertile men express more marital satisfaction than their partners. Furthermore, infertile women experience higher depressive symptoms which may have an impact on the overall marital relationship. Couples where both partners were responsible for infertility had the highest marital satisfaction levels than couples where either partner was responsible for infertility. This could be explained by a supportive environment experienced by both partners as no blame can be allocated to either partner. Moreover, both infertile partners understand each other's feelings as both hold the same responsibility. This allows for better communication among the couple which was reflected by the highest marital satisfaction levels among the groups. This is in line with previous research which mentions that effective communication and emotional support by both partners is needed to pursue ART treatment. Therefore, hypothesis four and five were supported and a significant difference in marital satisfaction levels was found between couples depending on partner responsibility for infertility.

Additional independent t tests were conducted to further understand how each partner in the relationship deals with infertility treatment according to responsibility. Results showed that when the man was responsible for infertility in the relationship, women still experienced significantly higher levels of depression and lower levels of marital satisfaction. This could be

explained by previous literature which mentions that women experience higher levels of depression than men. These higher levels may have been one of the contributed factors to lower marital satisfaction levels. A significant difference was not found between men and women on levels of state anxiety in line with previous literature which mentions that both partners experience levels of state anxiety. Results also indicated that females responsible for infertility had significantly higher levels of depression and state anxiety as well as significantly lower levels of marital satisfaction compared to their partners. This could be explained by the importance of "motherhood" as previously mentioned. The identity of women is attached to being a mother, so when conception does not occur, there is a loss which is associated with depression, anxiety, and marital satisfaction levels. Moreover, results indicated that when both partners were responsible for infertility, there was no significant difference between the two on state anxiety and marital satisfaction levels. This could be explained by the support and understanding both partners provide to one another. Blame cannot be allocated to either partner improving communication between the two. However, women experienced significantly higher levels of depression than men, but once again this is in line with the literature that women do experience higher depression levels than men.

The results of this study not only showed that IVF/ICSI treatment creates individual problems, but also affects levels of marital satisfaction among couples. Psychotherapy can be useful in encouraging the couple to participate together in the evaluation and treatment process which enhances communication and understanding between the two. This will increase the level of support each partner may offer the other. Physicians only explain the medical aspects of the treatment process and ignore the psychological aspects. Having a psychologist on the

team can help couples discuss their feelings about infertility and its treatment. This can make the couple feel that they are "normal" again and that they infertility is not their only identity. A psychologist can help reduce depressive symptoms experienced by the couple, help reduce the state anxiety of the procedure and in turn improve quality of marital life. A psychologist can educate the patient about the possible psychological impact IVF/ICSI treatment may produce. It can also involve assessing whether the patient is ready emotionally to undergo such a procedure as already the process is stressful. It can help patients discuss how infertility has affected their self-image, feelings about themselves and about their marital relationship. Furthermore, the patient's hopes and expectations can be set to realistic terms by the psychologist (as some patients may be too negative and hopeless, which can affect their mental well-being throughout the procedure). This study has clearly shown that IVF/ICSI procedures do impact individuals psychologically. Therefore, this study highly encourages psychologists to be involved in the IVF/ICSI treatment team in Lebanon as they can relieve patients from unnecessary concern and stress.

Although this study was supported by previous research, it had many limitations. First, the sample size consisted of 120 participants (60 couples each) representing a small population of couples undergoing IVF/ICSI treatment. Second, many demographic questions were not taken into consideration to make sure the participants of this study represented all patients undergoing IVF/ICSI treatment in Lebanon. Finally, the instruments used in this study were English-based, so although the participants were all Lebanese citizens, they had to know English to be able to answer the questionnaires. Future studies on IVF/ICSI treatment are required with consideration into which partner was responsible for infertility while taking into

consideration a more detailed demographic intake to make sure the study is representative of all infertile patients seeking treatment. Furthermore, this study consisted of data collected from self-reports, so data collected more objectively with different instruments could be beneficial in the future. In addition to that, the questionnaires used required knowledge of the English language, so possible reliable and validated Arabic based questionnaires could represent further all infertile patients seeking treatment.

In summary, infertility has a psychological impact on both infertile men and women in Lebanon. This study examined differences among men and differences among women in terms of depression and state anxiety levels with respect to who was responsible for infertility. Results indicated that infertile men and infertile women responsible for infertility experienced higher levels of depression and higher levels of state anxiety than infertile men and women not responsible. Gender differences were found between men and women in the sample on levels of depression. Lastly, the overall level of marital satisfaction of couples differed with respect to which partner was responsible for infertility. Although this is the first study of this kind to be done in Lebanon, these results were explained as much as possible by the literature of previous research on depression, anxiety, and marital satisfaction levels.

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Appendix I

Consent Form

I agree to take part in this study, which has been explained to me. I have been given an opportunity to ask questions about the study. I understand that any questions I answer will be anonymous, and that my identity will not be disclosed at any point. I also understand that my participation is completely voluntary, and I may withdraw from the study at any time. I am 18 years old or over, and am legally able to provide consent.

Signature of participant _____

Date _____

Appendix II

Demographic and Clinical Data Form

1) Age:
2) Gender:
3) Educational Status? Primary – Secondary – Technical school – University degree
4) Are you Lebanese?
5) Years of marriage?
6) Years of infertility?
7) Who is the cause of infertility? Male – Female - Both
8) Is this the first time you undergo IVF? Yes – No
9) Do you have any history of psychiatric illnesses?

Appendix III

Beck Depression Inventory – II (BDI-II)

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feeling during the **past two weeks, including today**. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness

0 I do not feel sad.
1 I feel sad much of the time.
2 I am sad all the time.
3 I am so sad or unhappy that I can't stand it.

2. Pessimism

0 I am not discouraged about my future.
1 I feel more discouraged about my future than I used to be.
2 I do not expect things to work out for me.
3 I feel my future is hopeless and will only get worse.

3. Past Failure

0 I do not feel like a failure.
1 I have failed more than I should have.
2 As I look back, I see a lot of failures.
3 I feel I am a total failure as a person.

4. Loss of Pleasure

0 I get as much pleasure as I ever did from the things I enjoy.
1 I don't enjoy things as much as I used to.
2 I get very little pleasure from the things I used to enjoy.
3 I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings

0 I don't feel particularly guilty.
1 I feel guilty over many things I have done or should have done.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.

6. Punishment Feelings

0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

7. Self-Dislike

0 I feel the same about myself as ever.
1 I have lost confidence in myself.
2 I am disappointed in myself.
3 I dislike myself.

8. Self-Criticalness

0 I don't criticize or blame myself more than usual.
1 I am more critical of myself than I used to be.
2 I criticize myself for all of my faults.
3 I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes

0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10. Crying

0 I don't cry anymore than I used to.
1 I cry more than I used to.
2 I cry over every little thing.
3 I feel like crying, but I can't.

11. Agitation

0 I am no more restless or wound up than usual.
1 I feel more restless or wound up than usual.
2 I am so restless or agitated that it's hard to stay still.
3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

0 I have not lost interest in other people or activities.
1 I am less interested in other people or things than before.
2 I have lost most of my interest in other people or things.
3 It's hard to get interested in anything.

13. Indecisiveness

0 I make decisions about as well as ever.
1 I find it more difficult to make decisions than usual.
2 I have much greater difficulty in making decisions than I used to.
3 I have trouble making any decisions.

14. Worthlessness

0 I do not feel I am worthless.
1 I don't consider myself as worthwhile and useful as I used to.
2 I feel more worthless as compared to other people.
3 I feel utterly worthless.

15. Loss of Energy

0 I have as much energy as ever.
1 I have less energy than I used to have.
2 I don't have enough energy to do very much.
3 I don't have enough energy to do anything.

16. Changes in Sleeping Pattern

0 I have not experienced any change in my sleeping pattern.

1a I sleep somewhat more than usual.
1b I sleep somewhat less than usual.

2a I sleep a lot more than usual.
2b I sleep a lot less than usual.

3a I sleep most of the day.
3b I wake up 1–2 hours early and can't get back to sleep.

17. Irritability

0 I am no more irritable than usual.
1 I am more irritable than usual.
2 I am much more irritable than usual.
3 I am irritable all the time.

18. Changes in Appetite

0 I have not experienced any change in my appetite.

1a My appetite is somewhat less than usual.
1b My appetite is somewhat greater than usual.

2a My appetite is much less than before.
2b My appetite is much greater than usual.

3a I have no appetite at all.
3b I crave food all the time.

19. Concentration Difficulty

0 I can concentrate as well as ever.
1 I can't concentrate as well as usual.
2 It's hard to keep my mind on anything for very long.
3 I find I can't concentrate on anything.

20. Tiredness or Fatigue

0 I am no more tired or fatigued than usual.
1 I get more tired or fatigued more easily than usual.
2 I am too tired or fatigued to do a lot of the things I used to do.
3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

3 4 5 6 7 8 9 10 11 12 A B C D E

Appendix I

State Anxiety Inventory-Form Y

DIRECTIONS:

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel *right* now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I feel strained	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel satisfied	1	2	3	4
9. I feel frightened	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel indecisive	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel confused	1	2	3	4
19. I feel steady	1	2	3	4
20. I feel pleasant	1	2	3	4

Appendix V

INDEX OF MARITAL SATISFACTION (IMS)

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

1 - Rarely or none of the time
2 - A little of the time
3 - Sometime
4 - A good part of the time
5 - Most or all of the time

1. I feel my partner is affectionate enough.
2. I feel that my partner treats me badly.
3. I feel that my partner really cares for me.
4. I feel that I would not choose the same partner if I had it to do over.
5. I feel that I can trust my partner.
6. I feel that our relationship is breaking up.
7. I feel that my partner doesn't understand me.
8. I feel that our relationship is a good one.
9. I feel that ours is a very happy relationship.
10. I feel that our life together is dull.
11. I feel that we have a lot of fun together.
12. I feel that my partner doesn't confide in me.
13. I feel that 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. I feel that we manage arguments and disagreements very well.
17. I feel that we do a good job of managing our finances.
18. I feel that I should never have married my partner.
19. I feel that my partner and I get along very well together.
20. I feel that our relationship is stable.
21. I feel that my partner is pleased with me as a sex partner.
22. I feel that we should do more things together.
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.

Appendix VI

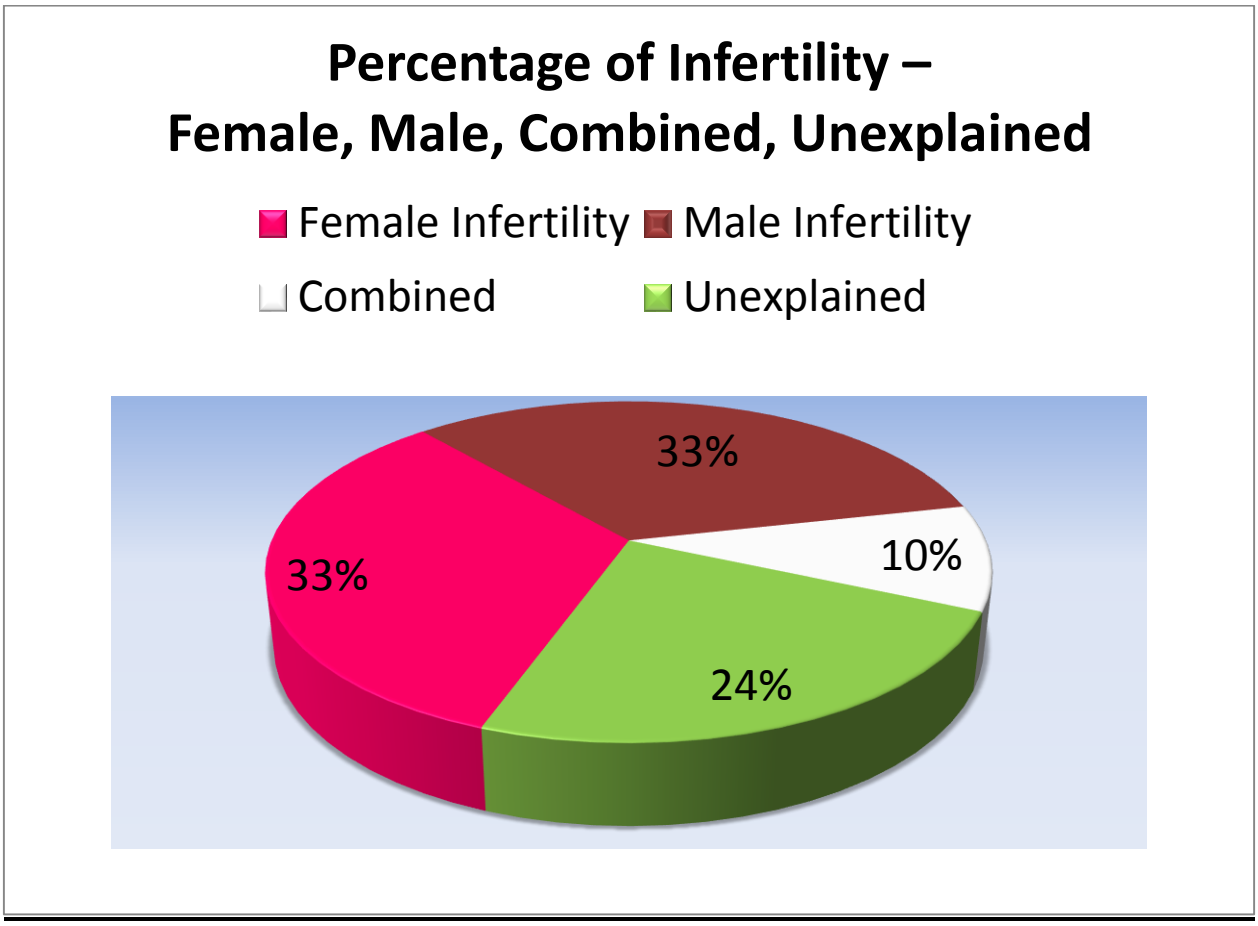

Figure 1.1 - Percentage of Infertility

Appendix VII

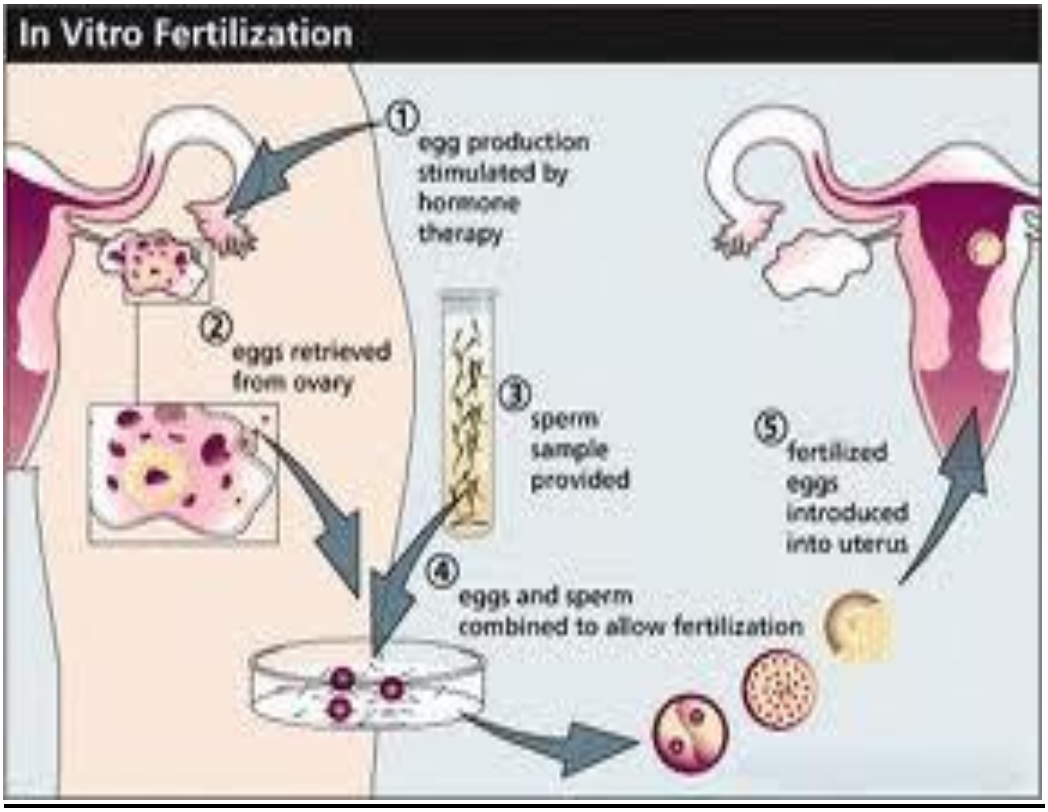

Figure 1.2 – In Vitro Fertilization Procedure

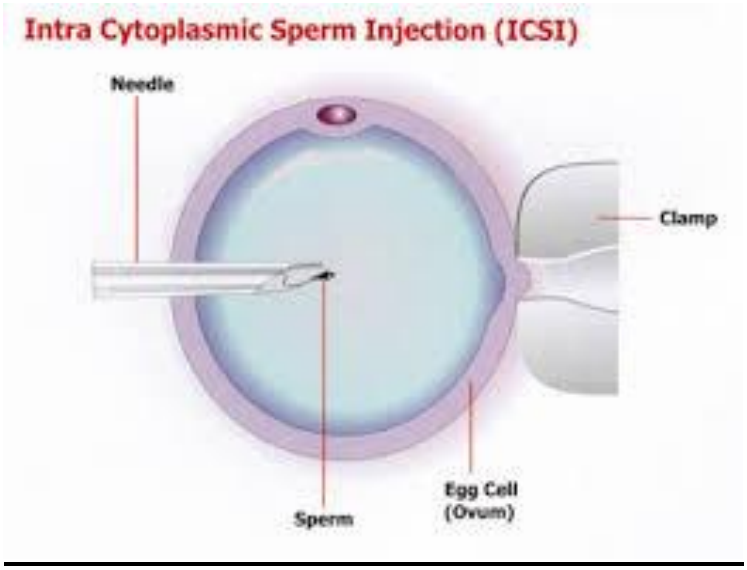

Figure 1.3 – Intra Cytoplasmic Sperm Injection Procedure

Appendix VIII

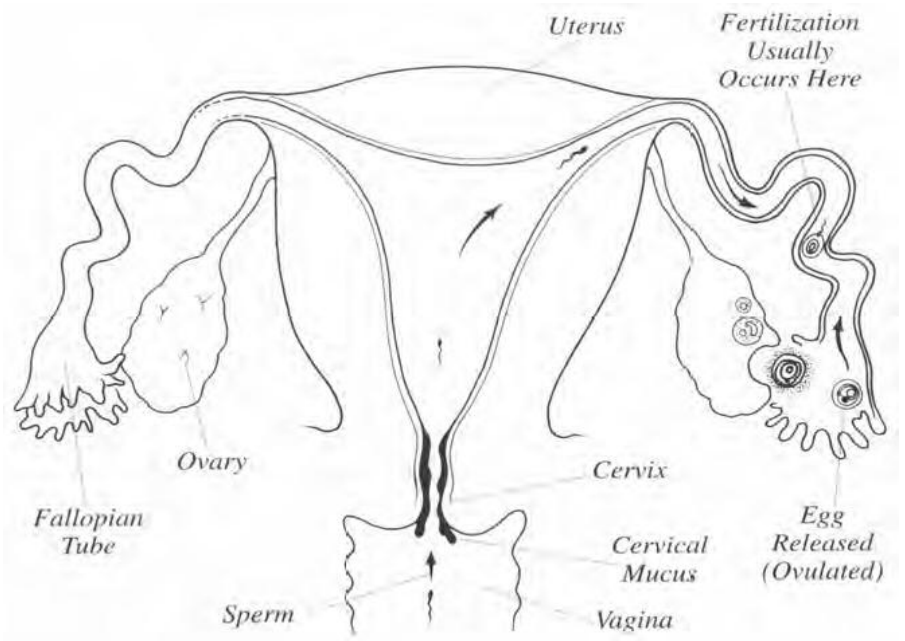

Figure 2.1 – Normal Conception Process