STRESS AND ANXIETY IN IVF AND NON-IVF PREGNANCIES

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Abstract

As an increasing number of couples experience difficulties conceiving a child, the demand for assisted reproductive technologies (ARTs) continues to grow. A great deal of research has been done on the process of enabling conception but much less research has been done on pregnancy experiences of the parents, and previous research has concluded that couples treated with ARTs experience higher levels of stress and anxiety. Given that these responses can negatively impact the development of the foetus, this is an important area of study. The aim of this study was to compare pregnancy experiences, including stress and anxiety levels, of women and their partners who were pregnant after treatment with ARTs with pregnancy experiences of women and their partners who had conceived spontaneously. Participants in the study were 38 women pregnant from IVF, 31 IVF partners, 38 control women who conceived spontaneously, and 13 control partners. The women were all past their first trimester of pregnancy. All participants completed a battery of psychometric measures including demographic questionnaires and seven self-report inventories. The study found that IVF mothers did not experience pregnancy differently from control mothers, however, both IVF mothers and control mothers experienced higher anxiety and lower mood compared to their partners, and IVF couples reported lower quality of life. Focusing on IVF couples, the pregnancy experiences of partners revealed they felt more controlled in their relationship, irrespective of having prior children, and IVF couples with children felt less supported from family and their social network. Furthermore, IVF partners felt more controlled within their relationships irrespective of the treatment type used and the duration of the treatment process. Analyses also revealed two or more treatment cycles had an effect on

couple's ability to cope. The findings of this study showing similar pregnancy experiences between IVF mothers and control mothers, and IVF couples pregnancy experiences on the basis of prior family, treatment type and duration, is advantageous for the positive outcomes of their unborn children. The small number of control partner participants was a limitation of this study, and future research could include strategies that might improve the response rate. In addition, future studies could include qualitative data to gain a personal perspective as a supplement to statistical analyses, and longitudinal studies could compare similar groups from conception to a period after the birth of the child. The study showed the resiliency of IVF couples who had endured the processes of ARTs, some of whom commented that they would prefer extended professional care as an addition to the treatment processes.

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Stress and Anxiety in IVF and Non-IVF Pregnancies.

Stress and anxiety are concepts that are easily recognised, but difficult to differentiate, and it is generally recognised that stress and anxiety are a threat to quality of life, and to physical and psychological well-being (Cox, 1978). The feeling of "being stressed" is almost universal, and is often associated with emotions such as anger, fear and depression, and it is accepted that the effects of stress as tension or pressure are caused by challenging circumstances in individual's lives (Cox, 1978). The experience invokes physiological responses to reduce the stress, or psychological responses that serve as coping mechanisms, based on an individual's previous life-experiences and their ability to cope (Cox, 1978).

While the terms stress and anxiety are often used synonymously to refer to "the subjective psychological result of environmental pressure" (Rice, 1992, p.8), other researchers reported the development of anxiety as a result of prolonged stress exposure (Matuszewich et al., 2007). Spielberger et al (1983) differentiated between stress as a measurable concept that was required for performance, and anxiety, characterised by a sense of powerlessness and dependence that reduced an individual's sense of well-being (Humphrey, 2005).

Saddock and Saddock (2007) summarised anxiety as a normal human experience that alerted the body to protect itself against threats of physical or psychological damage (e.g., pain or possible punishment). The symptoms of anxiety have two components; feelings of discomfort and expectations of fear, and an awareness of sensations such as headache, sweating, stomach upset, and restlessness (Saddock & Saddock, 2007). Anxiety is often associated with depression and fear; the

fear component of anxiety was thought to be a combination of tension and fearful apprehension, where the person has difficulty identifying the cause of the anxiety and is left with a feeling of impending doom (Rachman, 1998). When it is severe, an anxiety reaction can prevent speech or movement, produce physical changes such as rapid pulse rates and dizziness, or form the basis of a phobia or other disorder (Rice, 1992).

Linked to anxiety, depression is a by-product of sustained stress, and those experiencing it are likely to feel anxious, worried and frightened (Allen, 2006). Genetic make-up and stressful early experiences are thought to make some people susceptible to negative emotional responses such as anxiety, distress and guilt, which can become a personality trait (Allen, 2006). Major life events can provide the ideal environment for depression as, reportedly, the majority of people, prior to being afflicted with depression, experience stressful life-events combined with emotional stresses (Allen, 2006). In a review of current literature concerning the aetiology of depression, Allen (2006) discussed the joint role of persistent and serious stress primarily around incidents of loss and disappointment. It appeared that on-going stresses that persisted over a period of two years may be more important as provoking agents for depression than single stressful incidents, and were accompanied by feelings of powerlessness, helplessness and lack of self-confidence (Allen, 2006). Depression and pathological anxiety comprise the most common group of psychiatric disorders, with women more likely to be affected than men (Saddock & Saddock, 2007).

From a biological perspective, stressors and stress responses are recognised by the body when it is under pressure (Nelson, 2000). Not all stress responses are

detrimental, and stress is often a necessary component for optimal performance, as revealed by early stress research done in the 1930s. It was found that in the short-term, stress responses could produce increased energy, increased oxygen intake and enhanced memory; and it restricted blood flow to areas not important for coping with an emergency situation, such as reducing digestion, reproduction, and pain perception (Rice, 1992).

During emergencies, physiological and behavioural responses prompt the sympathetic nervous system to release adrenaline that activates various organs (Sapolsky, 2004). Two endocrine systems, one involving adrenaline and the other involving glucocorticoids (recognised as the primary stress hormone, cortisol), constitute major components of the stress response (Nelson, 2000). Secretions of the sympathetic nervous system, adrenalin and noradrenalin, help individuals cope with emergency situations in the short-term (Sapolsky, 2004), but continued stress-response over the long-term tend to have undesirable effects, such as heart disease and strokes (Nelson, 2000). The role of adrenalin, noradrenalin, and the sympathetic nervous system were recognized as the instigators of the stress-response, causing changes in heart-rate, respiration and blood flow to prepare the body for a demand of a sudden burst of energy, identified as the 'fight or flight response' by Walter Cannon (Nelson, 2000).

There is evidence that there are important gender differences in the behavioural and cognitive responses to stress, particularly in regard to the 'fight or flight' response. Taylor (2006) argued that the stress response can be different for females, showing there are gender differences in stress-management styles, constructed around the tendency toward social connection that precludes a female

with young from the option of flight. Taylor (2006) found a hormonal mechanism that may contribute to a "tend and befriend" stress-response, incorporating the hormone oxytocin that stimulates maternal behaviour and activates milk production. Oxytocin secreted during stress may not just consist of preparing for fight or flight, but may involve tending and befriending behaviours that promote "social nesting" behaviours amongst nuclear families for protection and support, also drawing attention to the importance of social and familial support in maternal perceptions of well-being (Gameiro, Boivin, Canavarro, Moura-Ramos & Soares, 2010).

The brain can activate the stress-response hormonally by experiencing, or thinking of, something stressful that may happen in the future (Sapolsky, 2004). While anticipatory responses can be protective, allowing preparation for an imminent stress response, the stress-response activated repeatedly for no reason can produce conditions referred to as anxiety, neurosis or paranoia (Sapolsky, 2004).

The concept of stress has been discussed and differentiated in a variety of ways that show how particularly disruptive it can be to human functioning. While the process of reproduction can be surprisingly resistant to stress, for a subset of the population, the stress of achieving pregnancy might also diminish the chances of having a child, irrespective of the mode of conception (Anderheim, Holter, Bergh and Moller, 2005).

Antenatal effects of stress.

Commonly held cross-cultural views that the development of the unborn child is influenced by the circumstances of the mother (Jomeen, 2004) are validated by recent research that supports an association between difficulties in early prenatal life and risk for later cognitive and behavioural weaknesses and serious illness (Riecher-

Ross & Steiner, 2005). Recent animal research examining the consequences of prenatal environmental stress found stress during gestation can detrimentally affect the brain and developmental processes of the unborn off-spring, and it can also change the way mothers care for their infants (Del Cerro et al., 2010). The researchers posited that if these findings were generalized to humans, as well as affecting the development of the foetus, it could be expected that mothers who experience chronic psychological stress during pregnancy could be more likely to abuse or neglect their children than mothers who are either not stressed, or who experience only brief periods of stress during their pregnancy (Del Cerro et al., 2010).

In a review of women's psychological health in pregnancy, childbirth and post-natal periods, women identified stress as a considerable problem. While most women did not regard stress as an illness and described genuine sickness as being physical, Jomeen (2004) concluded that for those reasons, women may not ask for help and support during times of emotional distress. The option of using pharmacological treatment methods for stress during pregnancy was ruled out by the women who participated in the study due to risk of teratogenic effects (Jomeen, 2004).

Another cross-cultural assumption was that pregnant women were protected, either by social mores or by stress- inoculation effects of the foetus, from anxiety disorders and associated perinatal- complications (Reichler- Rossler & Rohde, 2005). This premise has not been supported by recent research, however, as human behavioural studies show symptoms of anxiety and depression occur frequently during pregnancy (Talge, Neal & Glover, 2007). The relationship between prenatal stress and neonatal outcomes appears to depend on the nature of the stressful

experience as well as the specific outcome under investigation. Maternal reports of daily hassles, depression and anxiety symptoms could be associated with miscarriage, foetal structural malformations, preterm delivery and smaller size at birth, which are in turn risk factors for impaired cognitive and social development outcomes (Jomeen, 2004).

From a psychological perspective, childbearing is a complex and challenging event (Brockington, 2005) and despite varying backgrounds, education levels and degrees of preparedness for motherhood, it is likely that all women suffer from some level of anxiety in pregnancy, although its clinical relevance will vary (Jomeen, 2004). Changes in mood are common, and they are often triggered by whether the pregnancy was wanted or not, socioeconomic factors, and partnership issues (Riechler-Rossler & Rohde, 2005).

Looking at possible factors that may determine periods of motherhood anxiety, van Bussel, Spitz and Demyttenaere (2009) isolated two styles of maternal orientation; those that held the strong belief that their role was the primary and exclusive caretaker, and those that saw mothering as a shared task between their partner and significant others. The study then compared the groups with variables known for their association with anxiety, and found the women who expected to be the only care-giver of a child were more susceptible to post- pregnancy related anxieties, and feared separation from their child after delivery. The other group who viewed motherhood as a learned skill, and who were expecting to share the task of raising the child with extended family, were more vulnerable to anxieties related to the transition to motherhood such as fear of labour and fearing changes in their personal life (van Bussel et al., 2009).

Anxiety disorders have been isolated as more significant risk factors for postnatal depression (PND) than a history of depressive disorder, supporting a prenatal- programming hypothesis that acknowledged subtle changes of mood that change the uterine environment, while the foetal brain is developing, can result in long-term maladaptive patterns of behaviour and physiology (Kaplan, Evans & Monk, 2006).

Historically, a great deal of research has been conducted examining the effects of PND on individuals and families, but recently the role of antenatal depression (AND) has increasingly come under scrutiny. Factors associated with AND include lack of control of the environment, psychiatric history, inadequate social support, poor marital adjustment and stressful life events, and in addition to the mother's distress, the symptoms of AND have been identified as significant risk factors for a child's safety and wellbeing (Jomeen, 2004).

The placenta transports information, including anxiety and stress responses, from the mother to the child, having far-reaching effects of the developmental processes, particularly in the earlier part of pregnancy (Wadhwa, 2005). It has been suggested that signals of stress from the mother (glucocorticoids released as cortisol) prepare a foetus to expect a stressful world (Sapolsky, 2004. These effects may disrupt the child's behavioural and neuromotor development, and activate the development of stress responses that can be maintained into adulthood (O'Connor et al., 2003).

It appears uncertain what forms of anxiety and stress were most detrimental long-term. In a paper that reviewed the findings of 23 researchers who had studied the effects of antenatal stress and neurodevelopmental outcomes, Talge et al. (2007)

found the relationship between marital partners was particularly important for the child as marital discord was thought to be a risk factor for neurological dysfunction, developmental delays and behavioural disturbance during childhood. Infants of mothers reporting higher levels of depression and anxiety during pregnancy tended to display higher levels of negative affect and motor activity when presented with a series of novel toys, and that behavioural profile in infancy has been associated with shyness and anxiety disorders in later childhood (Talge et al., 2007). The researchers highlighted the fact that even though maternal anxiety and depression scores did not fall within the clinical range, they were predictive of subsequent child anxiety (Talge et al., 2007).

Knowing more about hormonal and other mechanisms underlying the effects of stress and anxiety during pregnancy and the gestational ages of vulnerability would help design the timing of effective antenatal interventions, and help understand the biological and hormonal situation in which the foetus is developing (Talge et al., 2007). Besides these, the considerable consequences of psychological status in pregnancy and childbirth need to be clearly understood, in order to plan and develop care for women accessing maternity services (Jomeen, 2004).

As outlined in the previous section, cultural beliefs about the vulnerability of the unborn child are supported by research findings that link the mother's stress levels to their child's cognitive and social development. Studies show that children are not only affected prenatally by their mother's stress, but their expectations of the world, and the care they will receive in it, may be triggered by the supportive, or otherwise, environment of the mothers. For some couples, stressful experiences may begin before conception as conceiving a child may not be straight- forward, and

infertility interventions may place these couples at higher risk of stress during pregnancy.

Stress and infertility

Disruption of reproductive function is a well known cause and consequence of stress (Wadhwa, 2005), and infertility can have dramatic effects that result in severe psychological stress affecting the martial relationship, causing estrangement from friends and family, and increasing rates of depression (Sapolsky, 2004). Defined by the World Health Organisation (WHO, 1992), "infertility is the inability of a couple to achieve conception or to bring a pregnancy to term after a year or more of regular, unprotected intercourse", and while it is not a life-threatening condition, it affects the mental and social well-being of those involved (Cassidy & Sintrovani, 2007).

Most cultural beliefs place importance on procreation, particularly the role of biological parenting. The status of motherhood is reinforced in society and infertility can challenge a woman's core female identity, resulting in a sense of failure when conception does not occur easily (Cousineau & Domar, 2007). In cultures that particularly emphasise the status and worth of women as mothers, further difficulties arise when women have to contend with the possibility of male infertility, and attempt to shield the male partner from shame and feelings of inadequacy (Lykeridou, Gourounti, Deltsidou, Loutradis & Vaslamatzis, 2009). For some couples, the problem of not conceiving and childlessness is a source of stress comparable with diseases such as cancer, and the stress of infertility treatment was ranked by couples undergoing treatment as worse than the death of a family member or divorce (Anderheim et al., 2005).

Infertile couples often experience isolation from friends and family, due to perceived social rejection and lack of understanding of the impact of infertility in a society that values parenthood. Some women experience jealousy and envy when they are confronted with other women's pregnancies and infants, yet they hide their feelings for fear of criticism (Cousineau & Domar, 2007). Some infertile women feel guilty and have a reduced sense of self-worth, viewing their infertility as punishment for past sexual misdemeanours, and consequently, they become so driven to achieve conception that it becomes their primary focus (Cousineau & Domar, 2007).

Some forms of infertility are solved with relatively simple procedures, but others require technologies that are very stressful for individuals and couples to undergo. Couples who decide to use medical treatments to achieve biological parenthood find the treatments change their lifestyles and carry high emotional and financial costs (Peterson, Gold & Feingold, 2007). Fertility treatments range from medical monitoring and medications to a range of assisted reproductive technologies (ARTs), and if conception fails to occur readily, feelings of disappointment and frustration may affect the couple as they struggle as individuals with self-esteem and body image (Cwikel, Gidron & Sheiner, 2004).

ARTs have been a major medical advance using donor eggs, donor sperm, and injection of an individual sperm (ICSI) when the problem is an inability of the sperm to penetrate the egg's membrane on its own. In vitro fertilization (IVF), in which sperm fertilises an egg in a container and the fertilized eggs are then implanted in the woman, generates stress by numerous procedures that can affect the mood and mental state dramatically (Peterson et al., 2007). The improvements in diagnosis of infertility, and the development of ARTs, have contributed to the view that infertility

is a medical issue, causing psychological aspects, such as stress, to diminish in importance, leaving the emotional issues of clients neglected in favour of treating biological factors as the primary cause of infertility (Anderheim, Holter, Bergh & Moller, 2005).

Infertility affects both men and women, although it is often viewed as a woman's inability to conceive. Hjelmstedt et al. (1999) studied gender differences in psychological reactions to infertility, and from 91 couples they found women reported a higher degree of anxiety, depression and reduced self-image compared to men. It was suggested, however, that men experienced the inability to conceive a child as being as stressful as women, but their expressions and reactions were different from those of women. Men tended to present themselves as "strong, silent providers" as defined by social expectations of the male role (Hjelmstedt et al, 1999). In a study comparing the emotional responses of men undergoing ICSI and those involved in IVF, Boivin et al. (1998) hypothesised that men undergoing ICSI might experience more distress during treatment than men undergoing IVF. From a study examining 40 couples, findings suggested that 40 men undergoing ICSI experienced greater anticipatory anxiety than those undergoing IVF, possibly because of a history of poor sperm quality, and waiting for results of fertilization made the transfer procedure somewhat more daunting for the ICSI patient (Boivin et al., 1998).

Similarly, Peterson et al. (2007) found that men's emotional response to infertility was similar to women's, in that men reported feelings of guilt and shame, low self-esteem, anger, isolation, loss and personal failure. Infertile men tended to have higher levels of anxiety and self-blame compared to fertile men, and reported higher levels of depressive symptoms, reduced marital and sexual satisfaction, and in

some cultural contexts, shame (Peterson et al., 2007). The inability to father a child is thought to cause men to doubt their masculinity, and they also feared they would lose their partner, yet they were less likely than their partner to share with others the emotional difficulties they experienced, further distancing themselves from social and familial support (Peterson et al., 2007).

Research has been conducted to evaluate the effects of demographic variables of age, educational, and social levels as indicators of fertility-related stress, depression and anxiety in infertile women. Recent findings suggest that while age and socio economic status do not appear to be associated with infertility-related distress, women with lower education levels were more at risk for depression, state and trait anxiety and social stress (Lykeridou et al., 2009).

Psychological responses to IVF treatment.

Infertility can be a major life crisis that has the potential to threaten the stability of relationships and individuals. The development of ART methods has enabled previously infertile couples to conceive a child; however, limited knowledge is available about the effects of previous infertility on a couple during the transition to parenthood (Repokari et al., 2007). Following the first successful IVF birth in 1979, investigations of the psycho-social consequences of infertility and infertility treatment have been published since the mid-1980s. Studies have shown consistently that infertility negatively affects emotional well-being, life satisfaction and self-esteem, and unsuccessful treatment leads to reduced life satisfaction, lowered self-confidence and psychological distress (Hammarberg, Fisher & Wynter, 2008).

Treatment failure was not necessarily detrimental to marital relationships as Repokari et al. (2007) found that some ART couples were more resilient to the

negative effects of psychological stressors, and the shared experiences of disappointments during infertility treatment improved the couples' feelings of bonding and improved their marriage. It was also suggested that the couples' commitment to continue fertility treatment despite failures can increase feelings of being united to achieve the same goal and that different aspects of infertility and treatment are important for marital satisfaction between couples, with the numbers of unsuccessful treatments and miscarriages affecting the marital relationship for women, and the increasing stress of long-lasting infertility for men (Repokari et al., 2007). Closely aligned with treatment failure, miscarriage can be considered a traumatic event that is often followed by depression and anxiety, and was often reported by those treated with IVF as a loss of a child rather than an unsuccessful treatment cycle (Repokari et al., 2007).

Couples participating in IVF procedures generally coped well psychologically, although women typically experienced more anxiety than men (Repokari et al., 2007). Boivin et al (1998) found that overall women reported significantly more distress during the treatment cycle than their partners, and the most distressing stages for both men and women were the stages of oocyte retrieval, embryo transfer and the pregnancy test day. Ardenti, Campari, Agazzi & La Sala (1999) found IVF was a highly stressful experience because of the high emotional investment in the IVF process, with the uncertainty of the outcome impacting on women's stress levels. In some individuals, infertility generates a feeling of inadequacy that is linked to its faulty reproductive organ, and Ardenti et al. (1999) posited that the technology of IVF offered a form of compensation in which women invested a lot of personal resources, which could leave them psychologically

vulnerable if the process failed. Eugster and Vingerhoets (1999) noted a tendency for partners to be overly optimistic and have unrealistically high expectations about the likelihood of a successful pregnancy after an IVF treatment. Those with less effective coping strategies were more vulnerable to developing clinical depression as couples realized they may never have a biological child of their own (Eugster & Vingerhoets, 1999).

The first treatment of IVF is thought to be a reliable indicator for further treatments, so Holter, Anderheim, Bergh and Moller (2006) concentrated on short-term emotional reactions and experiences of marital relationships after treatment that might suggest additional help and support was needed. From a group of 117 participants who were assessed before, during and one month after treatment, women seemed to have stronger emotional reactions to infertility than their husbands but men reacted at least as strongly as their partners when IVF failed, which was consistent with the findings of other studies (Holter et al., 2006). Most couples reported increased closeness of the marital relationship after unsuccessful IVF; however, there were couples who reported that their relationship deteriorated during treatment (Holter et al., 2006). Although women who repeated another cycle of treatment after a failed treatment were even more emotionally vulnerable, with a tendency to have sudden changes of mood and be socially withdrawn, the decision to undergo further IVF treatment may be considered an active means of coping with infertility, and so allowing better adjustment through dealing effectively with and accepting their condition (Bringhenti, Martinelli, Ardenti & La Sala, 1997).

Researchers acknowledged the role of stress in infertility and infertility treatment, with studies showing the reduction of stress and anxiety symptoms through

stress-management techniques or relaxation, and at the same time, an increase in conception rates (Eugster & Vingerhoets, 1999). It is commonly believed that patients with a positive out-look have better outcomes during health ordeals, and other findings show links between optimism and health such as better perinatal health outcomes and a more favourable biological response to fertility treatment (Eugster & Vingerhoets, 1999, Lancaster & Boivin, 2005).

To gain a better understanding of ART couples' emotional reactions, Knoll, Schwarzer and Kienle (2009) studied the transmission of depressive symptoms between marital partners after IVF. The study involved 82 couples, who had been in their current relationship for an average of nine years, and used self-report scales to rate the occurrence of depressive, loss and threat appraisals. Knoll et al. (2009) found that the transmission of depressive symptoms from men to women occurred at different phases of the treatment (from oocyte retrieval until after embryo transfer), but surprisingly, no depressive symptoms were transmitted from women to men during the same process. Knoll et al. (2009) suggested there could be a higher propensity for men to be aware of women's depressive symptoms, especially after routine reporting of the possible side-effects of hormonal stimulation treatments, which they made allowances for. Leniency for their partner's emotional reactions could be an effort to protect the relationship, which could also be associated with partner's strategies to protect their own, and their female-partner's, emotional well-being in times of stress (Knoll et al., 2009).

Looking for ways to overcome stress and anxiety in the IVF process, researchers explored the potential use of medications. Serafini et al. (2009) examined the anxiety-producing prospect of potential failure in the IVF process, particularly

during the first year of treatment in younger women and those who have suffered an extended duration of infertility. Clinical evidence shows that the brain's serotonin system plays a clear role in anxiety regulation, and proposed administering SSRIs to people undergoing IVF who were particularly vulnerable to anxiety as there was evidence to suggest it could be a contributing factor in miscarriage (Serafini et al., 2009). Contrary to the researchers' expectations, an SSRI (fluoxetine) failed to reduce STAI scores, indicating that medication may not be an effective treatment for IVF-associated anxiety as it did not alleviate anxiety levels on the day of the pregnancy test (Serafini et al., 2009).

The studies show generally that infertile couples undergoing IVF treatment are in good psychological health and can cope with the strain of treatment. Although IVF couples tended to have high expectations about a positive treatment outcome, the couples' resiliency was a protective factor for those who failed to achieve a pregnancy as most couples could manage the emotional suffering at a short-term level (Holter et al., 2006). Over the last two decades a substantial number of studies have examined the effects of stress on infertility and the outcomes of ARTs, and this study has presented just some examples of recent research. The couples who participated in this study had access to psychological counselling during the treatment process as guided by the client-help and support policy of Fertility Associates.

IVF pregnancy.

A pregnancy achieved through IVF is often the end of a long period of involuntary childlessness, infertility investigations, and treatments that are emotionally and physically challenging for many couples (Hjelmstedt, Widstrom & Collins, 2006). Over 1% of children born in the Western world are now conceived

through ART, including IVF, which as described previously, is often a long and stressful process (McMahon, Gibson, Leslie, Cohen & Tennant, 2003). After a documented period of infertility, an arduous process consisting of medical tests, and finally IVF treatment, the experience of drug- induced ovulation, monitoring of egg maturity, injections for hormonal stimulation, laparoscopic egg collection and collection of sperm samples from the male partner, the demands of the process are often diminished as prospective parents see only the end product; a "take home baby of their own" (Michelle, 2006, p.112). The process of attempts to conceive through IVF, and the physical and emotional commitment required, followed by pregnancy and subsequent parenting may present challenges not necessarily faced by couples who spontaneously conceive (McMahon et al., 2003).

Having intervened medically, clinicians may assume that stresses of infertility will be forgotten after assisted conception, and the resulting pregnancy will be straight-forward and pleasurable. In a review of 46 research papers examining the psychological and social consequences of IVF pregnancy, Hammarberg et al. (2008) found that couples who conceived after ART have varied demographic and social backgrounds, and they were older than average when they conceived. From samples of 10 to 367 couples, respondents typically had heightened levels of anxiety about pregnancy security and foetal health, especially those with prolonged treatment failure and high infertility- related distress, and their adjustment to parenthood may be hindered by an idealized view of parenthood (Hammarberg et al., 2008).

Age is an important factor in both the demand and the success rate of IVF. Some studies highlighted the issue of 'older' first-time mothers as many women are in their late twenties or early thirties before they begin to consider having children,

raising the issue of an ‘ideal age’ for child-bearing, and the stigma of older and IVF mothers giving birth relatively late in life after age 40. Recent decades have seen a gradual rise in the age at which women give birth to their first child as women are supported by improvements in healthcare and medical science. Increased rates of assisted reproductive technology, particularly IVF, could be responsible for these developments, with social and lifestyle factors also important contributors (Shaw & Giles, 2009). Several studies that focused on older women’s experience of pregnancy and childbirth have found better commitment to the parenting experience, and that older parents are less likely to take child- bearing for granted. Some studies however, have identified high levels of anxiety, particularly in IVF pregnancies, where women prepare themselves for possible failure and disappointment (McMahon et al., 2003), although much of the anxiety found in other studies was attributed to concerns about the social reactions of motherhood out of its predicted time-span (Shaw & Giles, 2009). Health professionals may contribute to the anxiety by treating older mothers as ‘special cases’ who are “difficult” and “needy”, and motivated by “selfishness” (Shaw & Giles, 2009, p.222). Boivin et al. (2009) noted that the parenting context is different for older mother families with more depressive symptoms in mothers and fathers, and less expressed warmth. Older women, particularly those approaching menopause, are more likely to need donated oocytes of a younger woman to conceive and experienced more problems during gestation, which Boivin et al. (2009) suggested could explain a tendency toward lower engagement in the pregnancy initially. The use of donated oocytes accounted for maternal (but not paternal) depression, and this finding might point to a biological explanation for age-group differences in maternal depression (Boivin et al, 2009).

Women who conceived through IVF are moved onto the care of a midwife or other maternity provider, and it is assumed they require no further specialised medical or psychological treatment from the fertility clinic (Klock & Greenfeld, 2000).In a study assessing the psychological status (marital adjustment, self-esteem and levels of depression and anxiety) of 74 first-time IVF women and 40 first-time women who conceived spontaneously at 12 and 28 weeks of pregnancy were examined in terms of self-esteem, depressive symptoms, or state and trait anxiety. Klock and Greenfeld (2000) found there were no significant differences between IVF and spontaneously conceiving mothers. Later studies conducted in the 13th, 26th and 36th week of pregnancy found both IVF mothers (n=57) and IVF partners (n=55) were more anxious about losing the pregnancy compared to couples who have conceived naturally, and they may have difficulty regarding themselves as successfully pregnant (Hjelmstedt, Widstrom, Wramsby, Matthieson & Collins, 2003, 2003b). IVF partners had a high degree of anxiety about the expected baby not being healthy and normal, but pregnancy anxiety decreased as the pregnancy progressed to similar levels to those experienced by partners of women who conceived naturally (Hjelmstedt et al., 2003b).

While IVF women were more focused on the pregnancy, which they experienced more positively than control women in areas such as pregnancy-discomfort, body-image, and parenthood expectations, IVF partners were more focused on the baby as a result of the pregnancy and were anxious about the baby's safety during birth (Hjelmstedt et al., 2003b). It is possible that the distress of previous infertility affects levels of anxiety throughout the whole pregnancy, increasing the concerns regarding pregnancy-loss and the health of unborn infant, but

engagement with the pregnancy improved as the pregnancy progressed (Hjelmstedt et al., 2003). These findings remained consistent with other studies reporting that IVF women experienced more satisfaction with being able to get pregnant, and were less concerned about body image, changes in weight and loss of their partner's attention than women who conceived naturally (Klock & Greenfeld, 2000). The IVF group reported improved self-esteem and decreased anxiety as the pregnancy progressed compared to the comparison group, and did not, as previously thought, become more anxious and depressed (Klock & Greenfeld, 2000). Furthermore, the assumption that previously infertile women regarded their pregnancy as particularly "precious" and "miraculous" was not supported (Klock & Greenfeld, 2000).

Further reviews of psychological and social aspects of pregnancy after assisted conception found the effects of subtle emotional and physiological changes that affected couples' quality of life with pregnant women reporting physical, financial and emotional limitations (Jomeen, 2004). Physical symptoms in pregnancy are intensified by depression and anxiety, and although few ART women and men reported depression, heightened levels of anxiety related to losing the pregnancy and foetal health were elevated in ART women, especially women who had experienced an extended duration of failed treatment and subsequent distress (Hammarberg et al., 2008). Citing the cumulative effects of infertility and ARTs on antenatal psychological functioning, Hammarberg et al. (2008) advocated extensive perinatal care for prospective and new parents who have previously experienced miscarriage and difficulties in conceiving.

Having conceived a child after ART treatment, the cause of the infertility remains, and couples may need to use the technology again to conceive another child.

Hjelmstedt, Widstrom, Wramsby and Collins (2004) assessed the impact of undergoing IVF treatment for a second child. Because IVF treatments were emotionally and physically demanding, some patients did not want to expose themselves to further treatment stress and possible disappointment about treatment failure, reporting that their emotional wellbeing tended to be disregarded after successful IVF (Hjelmstedt et al., 2004). Of the 53 IVF parents who participated in a qualitative and longitudinal quantitative assessment, some couples believed psychological factors had caused or contributed to their infertility problem, and that negative feelings related to infertility were not easy to overcome (Hjelmstedt et al., 2004). Less than half the couples who had conceived previously by IVF were planning on using ARTs to conceive again, citing physical and emotional strain as the main reason, even though their previous attempt was successful (Hjelmstedt et al., 2004).

In summary, research has shown that pregnancy as a result of ARTs can lead to stress, anxiety related to pregnancy, and future conception issues. Although the psychological reactions to infertility and infertility treatment are increasingly becoming the focus of investigation by researchers, there have been few studies conducted in New Zealand that consider the pregnancy experiences, including anxiety and stress levels, of women and men with their particular history. As the numbers of couples undergoing treatment continues to increase, it is important to look at how this population reacts psychologically to pregnancy compared to those who have conceived without the assistance of ARTs.

The overall aim of the study is to compare pregnancy experiences of couples who have undergone IVF with those who have conceived spontaneously.

More specifically, the study will:

1. Examine whether IVF couples experience pregnancy differently from couples without previous infertility problems;
2. Determine whether mothers experience pregnancy differently from their partner;
3. Focusing specifically on IVF couples, examine whether already having children had an effect on mothers' and partners' experience of pregnancy, and;
4. Determine whether mothers' and partners' pregnancy experience was affected by the type and duration of treatment.

Method

Participants

Two groups of participants were recruited for the study: IVF- treated couples who had passed the first trimester of pregnancy, and couples who had conceived spontaneously. Seventy couples who had been treated with IVF were telephoned, and of those, 56 agreed to receive a questionnaire. Fifty six questionnaires were sent out to mothers and partners, and of those that responded, 38 were female, referred to as mothers, and 31 partners responded comprising of 29 males and two females. The percentage of those approached that responded was 68%. The IVF participant mothers' ages ranged from 27 to 41, with a mean age of 35.71(SD 3.37). Of the participants, 89.5% identified themselves as NZ European or Pakeha, 5.3% identified as Maori, and 5.3% as European from the United Kingdom. The participant partners' ages ranged from 28 to 54, with a mean of 37.32 (SD 6.28), and 65.6% identified as New Zealanders of European descent/Pakeha, 21.8% identified as Maori, and 12.5% were from the United Kingdom.

A comparison sample of 38 women and their partners (n=13) who conceived spontaneously were recruited from a larger community group who had taken part in the parent study on stress and anxiety levels experienced by pregnant women and their partners. The women's ages ranged from 27 to 44 with a mean age of 34.18 (SD 4.03). The control partner's mean age was 33.16 (SD 4.65) and 75% of the participants identified themselves as NZ European or Pakeha, 16.7% identified as European, and 8.3% identified as Chinese.

The control mothers were selected on the basis of the couple actively planning and trying to get pregnant, then matched to the sample group using the following

criteria: the mother's age, the mother's level of health during this pregnancy (but before the previous week because some mothers, as part of the parent study, were hospitalized), the couple's involvement in a committed relationship (either married or de facto), and levels of income.

Measures

Participants completed a battery of psychometric measures made up of demographic questionnaires and seven self-report inventories (Appendix C and Appendix D). Two slightly different sets of questionnaires were used for the IVF and control groups (Appendix F). Both groups were asked about age, marital status, ethnicity and general health, and the IVF-treated group responded to extra questions inquiring about the number of pregnancies, outcomes of pregnancy, and types of infertility treatment undertaken to achieve pregnancy. Questionnaires were used to assess stress, hassles/uplifts, anxiety, depression/distress, relationship support, coping, and general quality of life. The control group completed several additional questionnaires, as part of a larger study, for domains of optimism and pregnancy-health behaviours (Appendix F). The demographic information asked whether the pregnancy was planned or not, and how established the pregnancy was when they found out they were pregnant.

The battery of questionnaires consisted of seven measures. The Perceived Stress Scale (PSS; Cohen & Williamson, 1988) was selected as the measure to assess stress as it was created for use in community samples, with general questions to suit any population group (Cohen & Williamson, 1988). Derived from the original 14-item scale, the PSS-10 consists of a ten-item self-report questionnaire that measures respondents' evaluation of the stressfulness of their lives over the past month and is

rated on a 5-point Likert scale (Never to Very often). Four of the items (4, 5, 7, and 8) on the PSS are positively stated, and scored 0 to 4, and the remainder are negatively worded and reverse-scored. The items are scored and summed across all ten items and totals can range from 0 to 40, with higher scores indicating higher stress (Cohen & Williamson, 1988). Cronbach's alpha, the coefficient for internal reliability, provided evidence that the items were measuring the same underlying construct, was 0.78, making it a good measure of perceived stress (Cohen & Williamson, 1988). The PSS has been used successfully to study stress in premature labour (Lowenkron, 1999) and to assess maternal adjustment (Gameiro et al, 2008).

The anxiety domain was assessed by the Spielberger State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch & Lushene, 1983). It is an instrument for measuring anxiety in adults and differentiates between the temporary tense and apprehensive feeling of 'state anxiety', and long-standing personality quality of 'trait anxiety' (Spielberger et al, 1983). The scale consists of 20 items referring to current anxiety and 20 items assessing general anxiety levels. Participants are asked to respond to statements (e.g., "I feel calm"), and give an answer that describes their feelings at that time on a scale from 1 (not at all) to 4 (very much so). Participants are then requested to respond to statements about their general feelings (e.g., "I feel satisfied with myself") on a scale from 1 (almost never) to 4 (almost always). The range of scores is from 20 to 80on each subscale, the higher the score indicating greater anxiety (Spielberger et al., 1983). Reported reliability of the STAI-T subscale was high (α=0.92) in a study examining the effects of trait anxiety on the outcome of fertility treatment, with test-retest reliability of 0.73 to 0.86 (Lancaster & Boivin, 2005). In a similar study, Eugster, Vingerhoets, van Heck and Merkus (2004) also

found women who were likely to experience trait anxiety were less likely to become pregnant after IVF.

The domain of depression/distress was assessed by the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden & Sagovsky, 1987). The scale was developed for screening, rather than diagnosing, postpartum women for depression (Jomeen, 2004). It consists of 10 items rated from 0 to 3, with 0 indicating no intensity and 3 indicating strong intensity of depressive symptoms. Questions 1 ("I have been able to laugh and see the funny side of things"), 2, and 4 are scored from 0 (as much as I always could) to 3 (not at all), and questions 3 ("I have blamed myself unnecessarily when things go wrong"), 5, 6, 7, 8, 9, and 10 are scored from 3 (yes, very often) to 0 (no, not at all). The total score is determined by adding the scores for each of the items, and a cut-off score of 12 is used to indicate a possibility of depression and when follow-up is needed (Cox et al, 1987). Various studies have found a cut-off score of between nine and thirteen predicted clinically significant depression. Although the EPDS has been widely used with postnatal women, it has also been increasingly used with antenatal women to assess anxiety and depression across the perinatal period, specifically identifying antenatal mood as a predictor for postnatal depression (Wickberg, Tjus & Hwang, 2005). In a study conducted on Nigerian women after perinatal loss, the EPDS was found to be an effective screening instrument in identifying women at risk of perinatal depression (α=0.75) (Adeyemi, et al., 2008). Because some women fail to be identified for emotional problems during the childbearing period, the EPDS was evaluated for use in routine antenatal care (Wickberg et al, 2005).

To assess relationship support, the Intimate Bond Measure (IBM; Wilhelm and Parker, 1988) was used. This scale was developed to measure two important components of an intimate relationship, the dimensions of care and control (Wilhelm et al, 2000). The IBM consists of 24 items on two subscales, and is rated on a Likert scale from 0 to 3. The participant is asked to judge their partner's recent attitudes and behaviour (e.g., "Is affectionate to me", or "Seeks to dominate me"), and rate them from 0 (not true at all) to 3 (very true). Both subscales have a minimum score of 0 and a maximum score of 36, and higher scores on each dimension indicate higher perceived care and control (Appendix B6). The 12 items on the 'care' scale focus on constructs of warmth, consideration, affection and companionship and have been shown to correlate with similar care scales (Parker & Ritch, 2001). The 'control' scale focuses on subjective interpretations of lack of acceptance, criticism and control exerted by the partner (Wilhelm et al, 2000). The constructs of care and control in the IBM combine to make a useful and validated measure for providing consistent information about relationship- perceptions with internal consistency reported at 0.96. The IBM has been used in a number of studies to assess the likelihood for pregnant women developing depression (Wilhelm, Brownhill & Boyce, 2000).

Belief in one's ability to cope was measured using the Coping Self-Efficacy Scale (CSES; Chesney, Folkman & Taylor, 2006) to assess participants' perceived confidence in his or her ability to cope effectively with psychological challenges and threats. Chesney et al (2006) found people experience fewer psychological problems when their coping strategies match the demands of the stressful events they might experience in their lives. The scale is a 26 item measure and is rated on an 11 point scale, indicating the extent participants believe they could perform behaviours

important to adaptive coping. Participants are asked how confident or certain they are that they could do tasks when things are not going well (e.g., “find solutions to your most difficult problems”). Scoring ranges from 0 (cannot do it at all), to 5 (moderately certain they can do it), to 10 (certain they could do it) and an overall CSE score is produced from averaging the total scores, with higher scores indicating higher self-efficacy (Chesney et al, 2006).

The CSE is made up of three factors: problem-focused coping that uses tools such as cognitive strategies (e.g. breaking a problem down into smaller parts) to make a problem easier to deal with; stopping unpleasant thoughts and emotions by altering emotional responses to a problem; and get support from the social network to test the perceived ability to use resources outside the self (Chesney et al, 2006).

Coefficient alpha values for problem-focused coping (e.g., “Sort out what can be changed, and what cannot be changed”) and emotion-focused coping (e.g., “keep from feeling sad”) were high (a=0.91), and the alpha for social support was also strong (a=0.80). The CSES was used successfully as a predictor of adherence to treatment plans of serious medical conditions, finding that higher scores predicted higher treatment adherence and a higher likelihood for seeking support (Johnson, Neilands, Dilworth, Morin, Remien & Chesney, 2007).

General quality of life was assessed on the Quality of Life Scale (QOLS; Burckhardt & Anderson, 2003). The original 15- item scale was created by Flanagan in the 1970s, and was adapted for use in chronic illness groups as an assessment of a broad range of human experiences related to an individual’s perception of their overall well-being (Burckhardt & Anderson, 2003). The original 15-iten scale had very good internal consistency (a = 0.82 to 0.92), and had high test-retest reliability

over 3-weeks in stable chronic illness groups (r= 0.78 to r= 0.84), which other researchers have also reported for the 16-item scale (Burckhardt & Anderson, 2003). QOLS is a valid assessment of quality of life across patient groups and cultures, and was created to be different from health status or other indicators of quality of life (Burckhardt & Anderson, 2003). After the addition of an item assessing independence and the ability to do for oneself, the scale consists of 16 items measuring material and physical wellbeing, relationships with other people, social, community and civic activities, personal development and fulfilment, recreation, and independence; each item is ranked on a 7-point satisfaction scale, from 7 (delighted) to 1 (terrible) to lifestyle concepts, such as material comforts and having and rearing children. The QOLS is usually self-administered and is scored by adding up the score of each item to produce a total score, ranging between 16 and 112. A higher score indicates higher quality of life, with an average score for healthy populations about 90 (Burckhardt & Anderson, 2003). Burckhardt et al (2003) used the QOLS in chronic illness groups and found further evidence for construct validity for chronically ill and healthy men and women with very good internal consistency (a=0.82 to 0.92) and had high test-retest reliability over three weeks instable chronic illness groups (r=0.78 to 0.84).

Procedure

The study received ethical approval from the Northern Y Ethics Committee, the University of Waikato, Psychology Department Ethics Committee, and was approved by Fertility Associates (Hamilton) (Appendix A).

Two different strategies were used to recruit the IVF and control group couples. IVF couples were initially contacted by telephone by the counsellor at

Fertility Associates (Hamilton) to determine if they would be interested in taking part in a study. Those who indicated they would be willing participate in the study received the questionnaires, which were mailed from Fertility Associates to protect patient privacy, and returned to the researchers at the University of Waikato in a reply-paid envelope. Questionnaire packages (Appendix B) included a cover letter giving a brief overview of the study and instructions (Appendix D). The cover letter explained the nature of the research and the requirements of the study, and that completing the questionnaire would take about 15 minutes. Consent was not explicitly sought on a separate form, but was assumed on return of the questionnaire or submission of the online format of the survey. The participants were given the option of completing the questionnaire online, and were assured their participation was not recorded on their file, nor would it affect their current or future care at Fertility Associates in any way.

To increase the response rate, two months later a reminder letter was posted from Fertility Associates (Hamilton) to the list of potential participants, who had been telephoned earlier in the project (Appendix E). The letter thanked those who had already returned the questionnaires and asked those who had not yet completed them to return them if they wanted to be part of the study.

A comparison sample of women (n=38) who had conceived naturally and their partners (n=13) were recruited from midwifery clinics, antenatal classes and other community groups in Hamilton and Waikato area. The control women had taken part in a larger parent study with 227 mothers and 61 partners. They were selected from the larger sample on the basis of actively desiring and trying to become pregnant, and then the ones were selected who best matched the IVF mothers in terms

of the mother's age, involvement in a committed relationship, levels of health and combined household income. The participants received leaflets or cards inviting them to participate online, or they were offered hard copies of a more extensive set of questionnaires to be completed and mailed back to the University of Waikato in reply-paid envelopes (Appendix F). Participants were offered a $10 gift voucher as a token of appreciation of their participation.

The IVF –treated couples were informed that a summary of the study findings would be posted on Fertility Associates website after the completion of the study, near the end of 2010. Any queries the participants had about the research were directed to Sue Saunders, Counsellor at Fertility Associates, or to Dr Nicola Starkey at the University.

Data were collected over a period of four months, and all raw data was entered into PASW which was then used to calculate the summary scores for each of the questionnaires as described above.

Results

As mentioned previously, all raw data were entered into PASW version18.0 for Windows, and questionnaires were scored according to relevant instructions. Where participants had missing data, average scores from the remainder of the scale items replaced the missing values. No more than two missing data values were replaced for any one scale for any participant.

The results section is divided into three sections; the first section compares background information of couples who have undergone IVF (IVF couples) with couples who have conceived spontaneously (control couples). Section two examines pregnancy experiences after the first trimester of pregnancy in IVF and control couples. The third section focuses specifically on IVF couples to see whether their pregnancy experiences were affected by the number of children they had, the types of treatment undertaken, and the numbers of cycles taken to achieve this pregnancy.

Presentation of the results in the first section will begin with demographic information for the women and partners, then it will summarise the health and pregnancy histories of the IVF and control women.

Section 1:

Demographics

The control group (n=38) was selected from a larger community group who had taken part in the parent study of stress and anxiety levels experienced by pregnant women and their partners. Further details of how the control group was selected are presented in the method section, but briefly, they were taken from the parent study according to actively seeking to become pregnant; then matched according to the mother's age, household income levels, mother's health during this pregnancy, and

involvement in a committed relationship. The mean age of the IVF mothers (n=38) was 35.7 (SD 3.4), with ages ranging from 27 to 41 years. The mean age for the control women (n=38) was 34.2 (SD 4.0), with ages ranging from 27 to 44. There was no significant difference between the ages of the mothers in the two groups, indicating that the samples had been well matched (t (74) = 1.79, p>.05). Partners of IVF women (n=31) were aged between 28 and 54 (mean age 37.32, SD 6.28), and they were significantly older than partners of control women (n=13) who were aged between 26 and 41 (mean age 33.4, SD 4.5) (t (42) =2.04, p<.05). Other relevant background data relating to ethnicity, qualifications, household income and relationship type of the participants in the IVF group and the control group are shown in Table 1, and it should be noted that the response- rate of partners in the control group was much lower than in the IVF group.

As seen in Table 1, the majority of the participants in each group were New Zealanders of European descent/Pakeha with smaller representations from British, Maori and Asian ethnicities. Both IVF mothers and control mothers had similar levels of qualifications and chi-square tests were conducted to compare whether the levels of qualifications and distribution of qualifications differed between the groups of mothers and between the groups of partners. IVF mothers had qualifications that ranged from those attained after high school to post- graduate qualifications, and control mothers had qualifications that ranged from no formal qualifications to post-graduate degrees ($\chi^2(5)=14.70$, p >.05), which did not show a significant difference. IVF partner qualifications, as reported by IVF mothers, ranged from high school qualifications to post-graduate qualifications, and recent paid work was mainly involved in business or professional fields. Control partners qualifications covered

the whole range; from no formal qualifications to post-graduate qualifications, and recent paid work was conducted over the whole range of occupations from unskilled to professional, but tended to focus on areas of business or professional fields (χ^2 (4) =1.08, *p*>.*05*). As income levels were used to select the women in the control group, the numbers of couples in each income bracket were similar in both groups. Neither the IVF mothers nor the control mothers had household incomes of less than 30,000 dollars per year.

Relationship data showed that similar numbers of IVF women and control women were in committed, long-term relationships. Both groups of participants were in relationships, either married or de facto, which had been established for a number of years. IVF couples were not significantly different (M=9.6 years SD 4.5) from control couples (M=8.2 years SD 4.4), *t* (74) = 1.35, *p*= 1.81, with regard to duration of the committed relationship. Women in the IVF group had been in their partnership for a range of three to 18 years, and the control group's relationship length ranged from one and 16 years. Of the IVF partners, 36 were males (93.8%) and two partners were females (6.3%). All the partners of control women were male.

Table 1.

Demographic data for the IVF and control mothers, and IVF and control partners.

	Women		**Partners**	
	IVF (n=38)	Control (n=38)	IVF (n=31)	Control (n=13)
Ethnicity				
New Zealander/Pakeha	34 (89.5%)	35 (92.1%)	20 (64.0%)	10 (76%)
Maori	2 (5.3%)	1 (2.6%)	8 (25.6%)	0
Other European	2 (5.3%)	2 (5.3%)	3 (9.6%)	2 (15.2%)
Chinese	0	0	0	1 (7.6%)
Qualifications	0	2 (5.3%)	0	1 (2.6%)
No qualifications	4 (10.5%)	7 (18.4%)	7 (18.4%)	8 (21.1%)
High school	16 (42.1%)		18 (47.4%)	17 (44.7%)
Diploma/trade cert		3 (7.9%)		
Degree	12 (31.6%)	15 (39.5%)	7 (18.4%)	7 (18.4%)
Post grad degree	5 (13.2%)	10 (26.3%)	5 (13.2%)	5 (13.2%)
Household Income				
20,000 or less	0	0		
20,001-30,000	0	0		
30,001-50,000	4 (10.5%)	3 (7.9%)		
50,001-70,000	6 (15.8%)	4 (10.5%)		
70,001-100,000	10 (26.3%)	18 (47.4%)		
100,001 or more	18 (47.4%)	13 (34.2%)		
Relationship				
De facto	6 (15%)	5 (13.5%)		
Married	32 (84.2%)	32 (86.5%)		

Pregnancy History

As part of the background questionnaires, women were asked about their pregnancy history and these data are summarised in Table 2. As seen in Table 2, control women were significantly more weeks pregnant than IVF women, t (74) = 2.44, p =.02. While most of the women (60.5%) were in the third trimester of pregnancy, one IVF woman (2.6%) was in the first trimester of pregnancy and 14 (36.8%) were in the second trimester. Amongst the control women, eight (21.1%) were in the second trimester, and 30 (78.9%) were in the third trimester.

To determine if there were differences in the pregnancy histories of the two groups of women, a series of chi-squared tests were conducted on the numbers of women who had been pregnant before, the numbers of women who had miscarried (from 0 to 5 times), and the numbers of women who had aborted previous pregnancies (0 to 2) across the groups. From the findings summarised in Table 2, it can be seen there were no significant differences between the groups of women who had been pregnant before. Also, similar numbers of IVF and control women had one child, but the control women had more second or third children. Chi-square analyses performed on the outcomes of pregnancy (other than childbirth) of the IVF mothers and control mothers showed no significant differences between groups on history of miscarriage, abortion and stillbirth.

Table 2.

Previous pregnancy experiences for women treated with IVF (IVF mothers) and women who have conceived naturally (control mothers).

	Women		
	IVF (n = 38)	Control (n =38)	Statistics
Mean weeks of pregnancy	28 (7.70)	32 (5.24)	t (74) = 2.43, p =.02*
Number of women who had been pregnant before.	22 (57.9%)	25 (65.8 %)	χ^2 (7) = 10.85, p >.05
Women with 0 children	22	16	
Women with 1 child.	14	12	$\chi^2(3) = 6.88$, p >.05
Women with 2 children.	2	7	
Women with 3 children	0	3	
Previous miscarriages			
Total	8	12	$\chi^2(5)=4.28$, p >.05
Number of mothers with:			
0 miscarriages	30	26	
1 miscarriage	7	7	
2 miscarriages	0	2	
3 miscarriages	0	1	
4 miscarriages	1	1	
5 miscarriages	0	1	
Previous abortions	7	5	$\chi^2(2)=1.75$, p >.05
Numbers of mothers with:			
0 abortions	33	35	
1 abortion	3	1	
2 abortions	2	2	
Previous stillbirths	0	1 (2.6%)	

* p < .05

General Health

As part of the background questionnaires, IVF women and control women were asked about their general health before and during their current pregnancy (see Table 3). Chi-square tests were conducted on variables of health before pregnancy, health during pregnancy, and health during the last week to determine if the frequencies were similar in the IVF and control groups.

IVF women were not significantly different from control women in their appraisals of health. Health before this pregnancy was similar between both groups with most of the IVF women and control women experiencing good or very good general health, and the women in both groups had experienced healthy pregnancies. Ratings of pregnancy-health before the previous week showed most women from both groups felt they were healthy without, or having only minor, medical problems. The item inquiring about health during the last week was included because some women recruited for the larger parent study were hospitalized with pregnancy complications and were given the community questionnaire on the antenatal wards. Respondent's health ratings in the past week showed a similarity between the groups, with most women experiencing mainly healthy pregnancies as was part of the matching criteria.

Table 3.

Health experiences for women treated with IVF (IVF mothers) and women who have conceived naturally (control mothers).

	Women		
	IVF	Control	Statistics
Health before this pregnancy			χ^2 (3) =1.85,ns
Very good.	24	28	
Good.	9	5	
Okay.	2	3	
Ongoing concerns.	3	2	
Serious concerns.	0	0	
Health during this pregnancy (exc. the last week)			χ^2 (3) =0.46, ns
Healthy	20	21	
Mild problems	11	11	
Moderate problems	4	5	
Major problems	2	1	
Severe problems	0	0	
Health in the last week			χ^2 (3) = 5.81, ns
Healthy	25	18	
Mild problems	7	5	
Moderate problems	5	10	
Major problems	1	5	
Severe problems	0	0	

To summarise, demographic and health variables were not significantly different for IVF and control women in areas of age, ethnicity, qualifications and income levels. Both groups of women were in committed relationships with predominantly male partners. Most of the pregnant women were in the third trimester of pregnancy, although the control women had progressed further in their pregnancies than the IVF women. Both groups of pregnant women had similar numbers of previous pregnancies and children, as well as similar experiences of pregnancy-outcomes of miscarriage, abortion or stillbirth and both groups had experienced good health before and during pregnancy.

Section 2:

Comparison of IVF and control couples' experience of pregnancy

Before analyses were conducted to examine differences between the IVF and control groups, data were checked for normality and the internal reliability of each scale was calculated. Overall the scores for each of the scales were found to be close to normally distributed. Furthermore, the internal reliability coefficient Cronbach's alpha of each scale was above .79 for both pregnant women and their partners, indicating that all the scales showed good internal consistency. The reliability statistics are summarised in Appendix G.

To determine if there were differences between the IVF and control groups, and the mothers' and partners' experiences of pregnancy, a series of two way (type of pregnancy: IVF/ control; status: mother/partner) between-subjects analyses of variance (ANOVAs) were conducted on each of the pregnancy experience measures. Where there was a significant interaction, post hoc tests were conducted using Tukey's HSD.

Aim 1: Are there differences in pregnancy experience of IVF mothers and partners compared to control mothers and partners?

The first aim was to determine whether there were differences between the IVF couples' and the control couples' emotional responses of mood, perceptions of care and control within an intimate relationship, coping strategies and perceptions of wellbeing. While measures such as PSS, STAI and EDPS quantify levels of anxiety, stress and low mood, the other measures focus on relationship issues of care, control, coping and quality of life which may be important factors in the onset and the maintenance of distress.

Table 4 summarises the descriptive statistics and the ANOVA results for the IVF and control mothers and partners. In the interest of clarity, only statistically significant findings are reported in the text. With regard to perceived stress, analysis of the PSS showed no significant main effects of pregnancy type (IVF/control), status (pregnant or not pregnant) or significant interaction (Pregnancy type*status). Focusing on self-reported levels of anxiety, state anxiety levels were significantly higher in mothers compared to partners. There was a significant interaction between pregnancy type and mothers and partners, explained by control mothers showing higher state anxiety levels than both IVF mothers and partners. For trait anxiety, analysis revealed a significant main effect of status, and a significant interaction. Post hoc tests revealed that these findings were due to control mothers reporting significantly higher trait anxiety scores compared to their partners ($p<.05$). Examining mood and relationship factors, a significant main effect of status was found in analysis of the EDPS, showing mothers had lower mood than partners ($p<.05$). Analysis of the Control subscale of the IBM revealed a significant main

effect of status, with partners scoring higher on feeling controlled in their relationship than mothers. There were no significant differences between the groups in relation to coping self-efficacy, however, IVF couples scored lower than control couples on the quality of life scale.

In summary, there were no significant differences between the IVF mothers and control mothers in relation to stress, anxiety, relationship care and control, and coping self-efficacy; however, couples treated with IVF showed significantly lower quality of life than control couples. In comparison with their partners, both IVF mothers and control mothers experienced lower mood. Control mothers had higher levels of state and trait anxiety than IVF mothers, IVF partners and control partners, and partners felt more controlled within their relationships than mothers.

The clinical significance of these findings is that both groups of mothers and partners experienced pregnancy positively. Both groups of mothers were not significantly stressed during the latter part of their pregnancies. IVF mothers were less anxious than control mothers, but both groups of mothers reported responses that were well within acceptable average levels for pregnant women. Both groups of women experienced lower mood than their partners, although the levels were below the recommended cut-off point of 12 for all but eleven of the 76 mothers (six IVF mothers and five control mothers). Both IVF partners and control partners felt more controlled within their relationships, but the scores were low, indicating healthy relationship styles of acceptance and autonomy. While IVF couples showed lower quality of life scores, these were similar to average scores found by the developers of the QOLS (Burckhardt et al., 2003).

Table 4:

Descriptive statistics and ANOVA results for the IVF and control mothers and partners.

	Women		Partners		Main effects		Interaction
	IVF Mean (SD)	Control Mean (SD)	IVF Mean (SD)	Control Mean (SD)	Pregnancy type IVF/control	Status (mother/partner)	Pregnancy type*Status
PSS	14.34 (6.24)	14.97 (6.82)	11.87 (5.92)*	14.54 (6.92)	*F* (1,114) = 1.62	*F* (1,114) = 1.26	*F* (1,114) = 0.62
STAI: State	31.87 (9.88)	36.82 (11.09)*b*	33.16 (10.61)	25.67 (9.82)*c*	*F* (1,115) =.35	*F* (1,115) = 5.27*	*F* (1,115) = 8.40*
Trait	33.18 (8.60)	36.50 (8.84)*b*	33.77 (9.37)	27.92 (6.23)*c*	*F* (1,115) = 0.51	*F*(1,115) = 5.03*	*F* (1,115) = 6.62*
EDPS	6.11 (4.72)*a*	6.37 (5.02)*b*	5.03 (4.18)	3.54 (6.25)	*F* (1,115) = 0.40	*F* (1,115) = 4.00*	*F* (1,115) = 0.81
IBM: Care	29.89 (5.07)	31.76 (5.44)	29.32 (6.95)	32.00 (3.81)	*F* (1,113) = 3.82	*F* (1,113) = 0.02	*F* (1,113) = 0.12
Control	3.22 (3.50)	3.73 (4.03)	6.67 (5.65)*c*	8.25 (9.08)*c*	*F* (1,113) = 1.00	*F* (1,113) = 14.68*	*F* (1,113) = 0.26
CSES: Coping	7.25 (1.33)	7.22 (1.33)	7.23 (1.41)	7.90 (1.11)	*F* (1,112) = 1.41	*F* (1,112) = 1.42	*F* (1,112) = 1.61
Stop	6.80 (1.22)	6.56 (1.71)	6.93 (1.47)	7.55 (1.61)	*F* (1,112) = 0.40	*F* (1,112) = 3.33	*F* (1,112) = 1.96
Support	6.81 (1.42)	7.03 (1.44)	6.10 (1.81)	6.50 (1.93)	*F* (1,112) = 0.86	*F* (1,112) = 3.51	*F* (1,112) = 0.07
QOL	88.76 (11.74)	91.57 (9.32)	84.94 (13.18)	91.50 (9.67)	*F* (1,114) = 4.10*	*F* (1,114) = 0.71	*F* (1,114) = 0.66

* $p<.05$

a= significant difference from IVF partner.
b= significant difference from partner.

c= significant difference from pregnant partner.

Aim 2: The relationship of pregnancy experiences between mothers and partners.

The second aim was to focus on the mothers and their partners and examine whether there were similarities in the way they experienced pregnancy. A series of Pearson's correlations were conducted between mothers and partners for the sample as a whole, irrespective of their pregnancy type, across all the questionnaire measures. This was necessary because there were very few differences between the IVF and control groups; and with only 13 partners in the control group, analysis would have been difficult to conduct. The alpha for statistical significance was set at $p < .05$.

The only significant correlations from these analyses were between mothers and partners for the perceived stress scale and quality of life scale which showed significant positive correlations indicating that the couples' levels of perceived stress (r=0.32, p<0.05) and couples' levels of quality of life were related (r =0.39, p<0.01). Analyses of the remainder of the measures did not reveal any other statistically significant correlations. (See Appendix H).

Section 3:

IVF couples' pregnancy experiences

The final section of the results will focus specifically on IVF couples and consider factors, such as previous parenthood, treatment processes they had undergone to conceive and the number of treatment cycles taken to conceive, that may have an effect on pregnancy experiences.

Aim 3: Does previous parenthood affect IVF couples' pregnancy experiences?

The third aim of the study was to ascertain whether already having children had an effect on levels of stress, anxiety and related measures experienced during the

current pregnancy. To address this, further analyses were conducted focusing on whether having prior children affected anxiety during pregnancy in mothers and partners. A series of two way (family: children or no children; status: mother/partner) between subjects ANOVAs were conducted for each of the questionnaire measures. IVF women, with and without children, were compared with IVF partners, with and without children. Where there was a significant interaction, post hoc tests were conducted using Tukey's HSD.

Table 5 summarises the descriptive statistics and the ANOVA results for the IVF mothers and partners, with and without children. For clarity, only significant findings are reported here. Analysis of the control component of IBM showed significant main effects of status (mother/partner), explained by partners having higher scores on the control measure, irrespective of whether they had children or not. Analysis of the support component of CSES revealed significant main effects of having or not having prior children. These findings were explained by couples with prior children showing significantly lower scores across these measures than couples without prior children. No other statistically significant effects were found.

In summary, IVF mothers, regardless of whether they already had children or not, were not significantly different from IVF partners on levels of perceived stress, perception of care, confidence of ability to cope and perceived quality of life. However, the IVF partners experienced feeling more controlled in their relationships, irrespective of whether they had children, and IVF couples with children felt less supported by social and family networks.

Table 5.

Descriptive statistics and ANOVA results for IVF mothers and partners without children or with children.

	No children		Children		Main Effects		Interaction
Measure	Mothers (n = 22) Mean (SD)	Partners (n = 18) Mean (SD)	Mothers (n = 16) Mean (SD)	Partners (n = 13) Mean (SD)	Status (Mothers/Partners)	Family (Children/No children)	Status*Family
PSS	13.68 (6.54)	10.77 (6.57)	15.25 (5.89)	13.38 (4.71)	F (1,65) = 2.54	F(1,65) = 1.95	F(1,65) = 0.12
STAI: State	30.5 (8.08)	32.33 (11.55)	33.75 (11.96)	34.31 (9.49)	F(1,65) = 0.23	F(1,65) = 1.07	F(1,65) = 0.06
Trait	32.27 (8.34)	33.16 (10.43)	34.43 (9.06)	34.62 (7.99)	F(1,65) = 0.06	F(1,65) = 0.67	F(1,65) = 0.03
EDPS	5.81 (4.37)	4.66 (3.59)	6.5 (5.27)	5.54 (4.99)	F(1,65) = 0.90	F(1,65) = 0.49	F(1,65) = 0.01
IBM: Care	30.64 (4.87)	30.00 (7.44)	28.80 (5.32)	28.38 (6.37)	F(1,64) = 0.13	F(1,64) = 1.34	F(1,64) = 0.01
Control	3.36 (3.12)	5.61 (6.83)	3.00 (4.08)	8.15 (3.13)	F(1,64) = 10.63*	F(1,64) = 0.92	F(1,64) = 1.64
CSES: Coping	7.46 (1.28)	7.28 (1.48)	6.95 (1.37)	7.14 (1.35)	F(1,65) = 0.00	F(1,65) = 0.92	F(1,65) = 0.29
Stop	6.92 (1.26)	7.00 (1.54)	6.63 (1.17)	6.82 (1.41)	F(1,65) = 0.18	F(1,65) = 0.54	F(1,65) = 0.03
Support	7.08 (1.42)	6.53 (1.91)	6.44 (1.39)	5.52 (1.53)	F(1,65) = 3.57	F(1,65) = 4.57*	F(1,65) = 0.22
QOL	5.59 (0.72)	5.40 (0.86)	5.50 (0.77)	5.21 (0.70)	F(1,65) = 1.64	F(1,65) = 0.57	F(1,65) = 0.07

*p<.05

Aim 4: Do treatment types and duration affect the pregnancy experiences of IVF couples?

The fourth aim, focused specifically on the IVF couples, examined whether the treatment type and duration of treatment altered the couples' experiences of pregnancy. In a break-down of the types of treatment undertaken by the IVF mothers, 15 women (39.5%) had been treated with only IVF, 16 participants (42.1%) had completed IVF plus ICSI (microinjected sperm), four women (10.5%) had IVF with donor sperm, and three women (7.9%) become pregnant after thawed embryo replacement (TER). Before undergoing IVF treatment, four women (10.5%) had previously been treated with infertility medications.

To examine the effect of treatment type on pregnancy experience, the group was divided into those undergoing ARTs of IVF and ICSI. Comparatively small numbers of mothers had been treated with DI (n=4) and TER (n=3), so those women were included in the IVF or ICSI group, depending on the main mode of treatment. Subsequently, a series of two way between subject ANOVAs (treatment type: IVF/ICSI; status: mother/partner) were conducted to test for differences between mothers and partners treated with IVF, and mothers and partners treated with ICSI, in pregnancy experiences, including levels of anxiety and stress.

As seen in Table 6, the ANOVA results for the IVF mothers and partners showed there were no significant differences between those who had been treated with IVF and those treated with ICSI on any of the measures. The only significant effects were between mothers and partners on the control subscale of the IBM which are described in the previous section.

The second part of this aim considered whether the number of treatment cycles affected the pregnancy experience of IVF couples. Most mothers conceived on the first or second cycle. The mean number of cycles needed to conceive this pregnancy was 1.71 (SD 1.18); 17 women (61%) conceived after the first cycle, seven women conceived after two cycles (25%), one woman conceived after three cycles (3.6%), one woman conceived after four cycles (3.6%), and two women conceived after five cycles (7.1%). Ten IVF participants did not respond to this particular question.

Because the numbers of IVF mothers and partners who had taken more than two cycles to conceive were small (n=4), they were combined with the group who had taken two cycles to conceive. A series of two way between-subjects ANOVAs were conducted on each of the pregnancy experience measures for IVF mothers and partners whose treatment had taken one, or two or more, cycles to conceive. These data are summarized in Table 7. As can be seen in the table, there were no significant differences between those couples who took one, or two or more, cycles to conceive on any of the measures. Analysis of the control component of the IBM showed a significant main effect between the mothers and partners, which were the same as described above, and analysis of the coping subscale of CSES, which revealed a significant main effect between the numbers of cycles taken to conceive, showing couples who had been treated with two or more cycles of ART had lower coping scores.

In summary, there are no significant differences between those who had different treatments, or in relation to different numbers of treatment cycles.

Table 6.

Descriptive statistics and ANOVA results for IVF mothers and partners treated IVF and ICSI.

	Women		Partners		Main Effect		
Measure	IVF (n = 22) Mean (SD)	ICSI (n = 16) Mean (SD)	IVF (n = 19) Mean (SD)	ICSI (n = 12) Mean (SD)	Status (mothers/partner)	Treatment (IVF/ICSI)	Status *treatment Interaction
PSS	15.41 (5.81)	12.88 (6.70)	11.52 (5.84)	12.41 (6.26)	*F* (1,65) = 2.07	*F* (1,65) = 0.29	*F* (1,65) = 1.29
STAI: State	31.09 (8.35)	32.94 (11.89)	33.26 (10.78)	33.00 (10.81)	*F* (1,65) = 0.19	*F* (1,65) = 0.96	*F* (1,65) = 0.17
Trait	33.55 (8.94)	32.69 (8.36)	33.37 (9.97)	34.42 (8.71)	*F* (1,65) = 0.12	*F* (1,65) = 0.00	*F* (1,65) = 0.18
EDPS	6.41 (4.92)	5.69 (4.54)	4.82 (4.62)	5.33 (3.60)	*F* (1,65) = 0.73	*F* (1,65) = 0.01	*F* (1,65) = 0.29
IBM: Care	29.62 (5.48)	30.25 (4.61)	28.68 (7.35)	30.33 (6.44)	*F* (1,64) = 0.08	*F* (1,64) = 0.58	*F* (1,64) = 0.12
Control	3.57 (3.98)	2.75 (2.79)	6.32 (5.82)	7.25 (5.58)	*F* (1,64) = 9.84*	*F* (1,64) = 0.00	*F* (1,64) = 0.58
CSES:Coping	7.34 (1.38)	7.11 (1.28)	7.46 (1.56)	6.85 (1.08)	*F* (1,65) = 0.05	*F* (1,65) = 1.60	*F* (1,65) = 0.32
Stop	6.83 (1.32)	6.75 (1.10)	7.08 (1.67)	6.69 (1.10)	*F* (1,65) = 0.08	*F* (1,65) = 0.52	*F* (1,65) = 0.22
Support	7.13 (1.24)	6.38 (1.59)	6.18 (2.05)	6.00 (1.42)	*F* (1,65) = 2.77	*F* (1,65) = 1.38	*F* (1,65) = 0.52
QOL	5.59 (0.65)	5.11 (0.86)	5.43 (0.70)	5.15 (0.95)	*F* (1,65) = 1.88	*F* (1,65) = 0.93	*F* (1,65) = 0.30

*$p<.05$

Table 7.

Descriptive statistics and ANOVA results for IVF mothers and partners and number of cycles taken to achieve conception.

	Women (n = 28)		Partners (n = 22)		Main Effect		Interaction
Measure	1 cycle (n = 17)	2 or more cycles (n = 11)	1 cycle (n = 13)	2 or more cycles (n = 9)	Status (Mothers/partners)	Number of cycles (one, two or more)	Status * number of cycles
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)			
PSS	14.24 (5.06)	11.93 (5.23)	12.81 (3.43)	9.77 (5.63)	*F* (1,47) = 3.56	F (1,47) = 1.58	F (1,47) = 0.07
STAI:State	29.65 (7.54)	34.36 (9.64)	31.64 (8.33)	27.67 (8.65)	*F* (1,47) = 0.02	*F* (1,47) = 0.92	*F* (1,47) = 3.13
Trait	32.47 (8.54)	35.50 (9.05)	32.36 (5.14)	30.11 (9.22)	*F* (1,47) = 0.03	*F* (1,47) = 1.34	*F* (1,47) = 1.24
EDPS	5.71 (4.07)	5.93 (4.18)	4.82 (3.84)	3.78 (3.93)	*F* (1,47) = 0.12	*F* (1,47) = 1.71	*F* (1,47) = 0.30
IBM: Care	29.94 (5.77)	30.14 (6.33)	29.91 (5.28)	29.67 (7.04)	*F* (1,47) = 0.00	*F* (1,47) = 0.02	*F* (1,47) = 0.02
Control	3.35 (3.14)	6.36 (6.90)	3.36 (4.72)	6.67 (4.90)	*F* (1,47) = 4.72*	*F* (1,47) = 0.01	*F* (1,47) = 0.92
CSES:Coping	7.18 (1.29)	6.88 (1.29)	7.69 (1.18)	8.03 (1.49)	*F* (1,47) = 0.00	*F* (1,47) = 4.88*	*F* (1,47) = 0.74
Stop	6.71 (1.45)	6.69 (1.41)	7.04 (0.88)	5.53 (1.65)	*F* (1,47) = 0.36	*F* (1,47) = 2.19	*F* (1,47) = 0.41
Support	6.93 (1.40)	5.84 (1.79)	6.95 (1.24)	6.56 (2.34)	*F* (1,47) = 2.34	*F* (1,47) = 0.57	*F* (1,47) = 0.52
QOL	5.71 (0.66)	5.40 (0.84)	5.39 (0.56)	5.27 (0.82)	*F* (1,47) = 1.07	*F* (1,47) = 1.18	*F* (1,47) = 0.21

*p<.05

Discussion

The main purpose of this study was to determine whether pregnancy experiences of women and their partners after IVF treatment were different from women and their partners who had conceived spontaneously. Additional factors were considered, such as the type of treatment utilised to conceive, the number of treatment cycles, and whether already having children had an effect on levels of stress and anxiety experienced by IVF couples. This section will firstly compare the characteristics of the IVF group with the control group before summarizing the results from pregnancy experience measures. Finally the findings from the current study will be integrated with the outcomes of other studies, discussing their implications for clinical practice and research.

Background information

Consistent with other ART studies, the IVF group was matched closely with the control group, conforming to recommendations regarding the choice of comparison groups and recruitment strategies to provide more conclusive research outcomes (Hammarberg et al., 2008, Sutcliffe & Ludwig, 2007, Fisher et al, 2007). Both IVF women and control women were similar in their desire to become pregnant, age, living in a committed relationship and income level. Both groups were predominantly New Zealanders of European descent/Pakeha, of relatively high socio-economic level, and educated to levels of at least high school completion. At the time of responding to the questionnaire, control women were significantly further advanced in their pregnancies than the IVF women, but most women of both groups were in the third trimester of pregnancy.

The ages of the IVF and control women were similar (since that was one of the matching criteria for selection of the control group) and were above the

average of age 30 for a woman having her first child in New Zealand (Ministry of Women's Affairs (MOWA), 2008). Other researchers have found ART mothers were significantly older than mothers who conceived without the use of ARTs, and they also had a longer duration of marital relationship. The type of relationship, de facto or married, had been established longer in IVF couples (M=9.6 years SD 4.5) than that of the controls (M=8.2 years SD 4.4) as predicted by other studies (Klock & Greenfeld, 2000, McMahon et al, 2003, Hjelmstedt et al., 2003).

The subject and comparison group experienced a similar number of miscarriages and pregnancy terminations which differed from prior observations that a number of IVF women are in treatment because of a history of pregnancy loss (Klock & Greenfeld, 2000) and from previous findings in which IVF women had experienced more miscarriages than non- IVF women (Klock & Greenfeld, 2000, Hjelmstedt et al., 2003). This may be due to IVF women's definitions of miscarriage as a personal reassurance of the ability to become pregnant, rather than attributing a lack of pregnancy as treatment failure per se.

The treatment history of the IVF women (who were a sample of successful IVF clients) revealed only a small proportion of IVF women had undergone previous non-ART infertility treatment. Ministry of Women's Affairs statistics (2008) estimated that 15% of New Zealand couples have some difficulty conceiving a child, and 5% go on to have IVF treatment. According to recent research, the vast majority of people who sought infertility treatment were first treated with conventional medical therapies, such as medications and inter-uterine insemination procedures, and the remainder were treated with ARTs (Cousineau & Domar, 2007). ARTs consist of more invasive diagnostic procedures and

interventions that address female or male infertility, typically IVF or ICSI. An explanation for this provided by Fertility Associates was that GPs were referring clients to infertility clinics earlier, and that people having difficulties conceiving were able to self-refer, taking advantage of diagnostic procedures that could prescribe effective treatments. Fertility Associates (Hamilton, NZ) perform over 300 IVF cycles a year, and the demand for the service continues to rise as accessibility and successful outcomes provide previously infertile couples the opportunity of conceiving their own biological child (S. Saunders, personal conversation, June 24, 2010).

All the mothers in the IVF group had undergone IVF treatment, and in addition, almost half (16 of the 38) of the respondents had been treated with ICSI. Other ARTs had been used as four of the 38 women had conceived with donor sperm and three women had conceived after thawed embryo replacement (TER). The numbers appeared surprisingly small for TER since the procedure is an integral part of an IVF- cycle, but on reflection, this was hardly surprising since many of the IVF women conceived on the first cycle.

From this group of respondents, 65% had become pregnant in the first cycle of IVF, and altogether after two cycles, 85% of women had conceived. Although previous figures claimed only 10% of couples undergoing IVF achieve a pregnancy at the first attempt (Cassidy & Sintrovani, 2008), Fertility Associates achieve a pregnancy in 53% of women and a “take home baby” with 43% of women in the first cycle. After two cycles, 65% of clients will get a baby (S. Saunders, personal communication, June 24, 2010). The higher rate of success in these findings might be explained in part by the earlier intervention processes, including education consisting of discussions about the treatment processes and

possible causes of distress, that alleviate stress and anxiety previously implicated in negatively affecting couples' ability to conceive (Eugster et al., 2004). Although one woman in the sample group reported she had taken five cycles to conceive, that was within the number of acceptable trials of two to six cycles recommended in earlier ART research (Cassidy and Sintrovani, 2008).

The main aim in this study was to explore whether pregnancy experiences of IVF women differed from women who have conceived spontaneously. There were no significant differences between the two groups, although further analyses revealed some differences in pregnancy experience between mothers and partners, and between the IVF and control partners. Overall, the pregnant women had higher levels of state anxiety and trait anxiety, and lower mood than their partners. Finally, comparisons between the mothers and partners revealed that they shared similar appraisals of perceived stress and quality of life.

Focusing on IVF couples, further comparisons were made to see whether other factors, such as having previous children, affected levels of pregnancy stress. Findings indicated it did not as both IVF mothers and partners had similar levels of stress and anxiety, regardless of whether they had prior children, although IVF partners felt more controlled in their relationship than IVF mothers, irrespective of whether they had children or not, and couples with children felt less supported by their social network.

Additionally, IVF couples experiences of pregnancy were not affected by the type of ART or the number of cycles taken to conceive, although compared to mothers, IVF partners' responses were the same as noted above, and IVF couples had lower coping scores after two or more treatment cycles.

Experiences of anxiety and stress in pregnancy.

To address the first aim: IVF couples and control couples did not experience pregnancy differently; however, both IVF and control mothers had higher levels of state anxiety than their partners. According to Jomeen (2004), research has not fully considered the impact of psychological well-being on the mother throughout pregnancy, and the assumption has been that any distress associated with pregnancy is abnormal. It is possible all women suffer from some level of anxiety during pregnancy, which is consistent with the findings of this study (Jomeen, 2004). Klock and Greenfeld (2000) found that IVF mothers at 28 weeks gestation were not significantly more anxious or depressed than control mothers and reported decreased levels of anxiety as the pregnancy progressed. The group of IVF women (n=74) tested by Klock and Greenfeld (2000) were demographically similar to the IVF women in this study (n=38), and test results from the twelfth week of pregnancy showed IVF mothers' state anxiety scores were 35.33 (11.84), reducing to 32.00 (10.01) in the twenty-eighth week. The IVF women in the current study were not tested at specific phases of gestation, but they showed comparable state anxiety levels at average 28 weeks gestation of 31.87 (9.88), in the average range and below the cut-off level of 36 reported in a non-clinical sample of women in a study by Spielberger (1989). To the contrary, other researchers found IVF mothers were more anxious and distressed as the pregnancy progressed, particularly after 36 weeks, where the heightened levels of anxiety and stress were linked to specific fears in regard to pregnancy-security and to the safety of the baby during the birth process (Hjelmstedt et al., 2003b). These concerns were not specifically addressed in the measures used in this study and most of the women were not at this final stage in their pregnancies. Also,

Hjelmstedt et al. (2003b) measured anxiety using a scale they developed specifically for assessing perinatal emotional responses.

Overall, these findings are consistent with other studies showing that maternal mood changes and general feelings of anxiety are common in the third trimester, and that general anxiety may increase during pregnancy because of associated fears of delivery and changes in relationship after the birth (Hjelmstedt et al., 2003b). Furthermore, it is possible that levels of stress and anxiety could be higher for first-time mothers than experienced mothers because first-time mothers have to cope with psychosocial changes of role-change, role-conflicts, changes in status, and mixed feelings about pregnancy and motherhood (Riecher-Rossler & Rohde, 2005).

Compared to partners, mothers reported lower mood, and these findings were consistent with some previous studies in which women also reported lower mood than their partner during pregnancy. For example, those of Hjelmstedt et al. (2006, 2006b), whose IVF and control groups were demographically similar, found the mean IVF mothers' EDPS score at 26 weeks pregnant was 5.4 (4.4) and partner scores of 3.1 (2.5), compared with the current study's IVF mothers' scores of 6.11 (4.72) and partner scores of 5.03 (4.18). Although mothers' scores were closer to the cut-off scores than partner scores, they were below the margin between nine and 13 that may indicate clinically significant depression. Fisher, Hammarberg & Baker (2007) posited that IVF mothers' slightly lower mood could be attributed to moving from an infertile identity to a maternal identity that is psychologically demanding and may not become fully apparent until after the baby's birth.

Based on evidence that the quality of relationship with an intimate partner is an indicator of mood in pregnant women (Fisher et al., 2007), the findings of maternal mood were consistent with high scores in the care subscale of the IBM. The care component of the IBM was not significantly different for IVF mothers and control mothers, suggesting marital relationships were providing secure adult attachments, which were protective for higher levels of anxiety (van Bussel et al., 2009). Also, outcomes from the care subscale of the IBM revealed that of IVF mothers were not significantly different from IVF partners but IVF partners felt more controlled in their relationships than IVF mothers. The construct of "control" as a negative qualifier of relationship satisfaction has been acknowledged as a weaker construct because it consists of subtle cues that have meaning within relationships rather than being generalized over all partnerships (Wilhelm et al., 2000). Fisher et al. (2007) found higher feelings of control within their relationship scores from IVF mothers, which were thought to reflect additional emotional, financial and practical demands of pregnancy. Heightened feelings of being controlled attributed to the relationship could also be an effect of treatment requirements and vigilance to achieve and maintain pregnancy. To complete the picture of partnership satisfaction, additional research is required during transition to parenthood.

Control mothers were found to have higher levels of trait anxiety than control partners was inconsistent with previous findings that suggested there were no differences between pregnant and non-pregnant partners in levels of trait anxiety (Hjelmstedt et al., 2003, Klock & Greenfeld, 2000). Susceptibility to elevated levels of trait anxiety is a personality component of individuals who are prone to react to stressful situations with tension and worry, and is resistant to

change (Lancastle & Boivin, 2005). Trait anxiety has been linked to physical health and people's general sense of well-being, and had been hypothesised as a core aspect of a personality constellation that could indicate biological responses to interventions such as infertility treatments (Lancastle & Boivin, 2005). The sample of control partners was very small which may have biased the findings-, but research assessing the effects of trait anxiety on infertility might be useful in identifying clients who will require extra resources, such as counselling, during infertility treatment.

Although IVF is recognised as an invasive treatment and a source of anxiety and distress, this study did not find evidence that mothers and partners had different levels of stress. This was unexpected as in previous IVF studies women experienced significantly higher levels of psychological distress than IVF partners which was attributed to external factors such as higher levels of social pressure evident in some cultures (Cassidy & Sintrovani, 2008).

Lack of support was attributed to withdrawal from familial and social networks as couples tended to be more secretive about efforts to overcome infertility problems (Cassidy & Sintrovani, 2000). Analysis of the support component of CSES showed, however, that IVF couples did not differ significantly from non-IVF couples in their confidence in their ability to get support from friends and family.

Overall, IVF groups did not differ essentially from other future parents even though IVF couples were expected to be more anxious during pregnancy. In previous studies this anxiety appears to be accounted for by complications and pregnancy risks encountered by IVF mothers that may require more frequent and longer stays in hospital (Ulrich et al., 2004). Being hospitalized was not a result of

IVF treatment per se, but a likely consequence of increased concern by IVF mothers and their doctors to seek security of hospital rather than take a risk with an IVF pregnancy (Ulrich et al., 2004). To plan for the care requirements of women undergoing infertility treatment, information regarding the number and duration of stays in hospital required by IVF women would be useful.

Perceptions of stress and quality of life between pregnant and non-pregnant partners.

Addressing the second aim, this study found mothers and partners were similar in both their perceived stress levels and their perceptions of quality of life (Appendix H). Hjelmstedt et al. (2003) suggested perceived stress levels might be related to the security of the pregnancy and the health of the expected baby. Although previous studies have found some pregnancies were more stressful with, for example, more somatic complications, there were indications that couples were able to overcome psychological difficulties, which might be related to the closeness of their relationship (Ulrich et al., 2004).

Quality of life evaluations are typically associated with the physical and emotional changes associated with pregnancy, particularly from mothers' perspectives as their ability to achieve normal lifestyles are somewhat curtailed as their pregnancies progress (Jomeen, 2004). Burckhardt, Anderson, Archenholtz and Hagg (2003) examined a group of 1241 adults and found that material well-being and close personal relationships were related to a sense of security that people interpret as central to quality of life. The mean summed QOL score for mothers and partners in this study was 90 (QOL scores range from 16 to 116), placing them in the average range for a healthy population; and as mentioned previously, the mothers and partners in this study had higher income levels and

were in long-term committed relationships, which may predict higher QOL scores despite other difficulties.

Possible ways of dealing with stress and reduced quality of life may be to participate in support groups in which ART pregnancies are normalized by encouraging discussion about the difficulties encountered after treatment, and stress management programmes (Hjelmstedt et al., 2003).

The effect of having previous children on pregnancy stress and anxiety.

Accepting the premise that some people felt IVF babies are "precious and miraculous", and thereby potentially the cause of more negative pregnancy experiences during gestation, analyses revealed that partners felt more controlled within their relationships, irrespective of whether they had children or not, and couples with children felt less supported by family and social network. This was consistent with previous studies which suggested that stress levels were similar in IVF and control mothers, irrespective of whether they had children or not (McMahon et al., 2003, Hjelmstedt et al., 2004). Previously, Hjelmstedt et al. (2003) had questioned whether the impact of having children beforehand (particularly by ARTs) could have an effect on stress reactions to infertility during pregnancy, and whether the demands of coping with stress during the last treatment process had accumulated in subsequent pregnancies. This was unable to be determined as it was not known whether the IVF mother's prior children were biological, children from a blended family, or the results of ARTs. In hindsight, this would have been a useful question to include in the demographic section of the questionnaire.

Effects of anxiety and stress resulting from different types of ARTs and the number of cycles required to conceive.

Once again, IVF women were very resilient as they were no more stressed or anxious than IVF partners, regardless of the treatment received or the number of treatment cycles undertaken to conceive. As found in a previous analysis, IVF partners felt more controlled in their relationship, regardless of the treatment undergone for this pregnancy. Previous studies have focused on mothers' emotional responses and have found the cause of infertility diagnosis is an important factor in women's psychological strain, with some women experiencing more anxiety and stress from male-related infertility treatment (Lykeridou et al., 2009). Other studies found participants with male infertility (treated with ICSI and DI) reported higher levels of state anxiety and social stress than those with female related infertility because of social constructions of gendered fertility expectations (i.e., women having responsibility for both the prevention and perpetuation of fertility), particularly those supporting male self-esteem (Lykeridou et al., 2009). Expectations were that men undergoing ICSI would experience more anxiety than men whose partners have been treated with IVF, but while men treated with ICSI were more stressed during treatment; their reactions were no different from other men as the pregnancy progressed (Boivin et al., 1998). A lack of accounted anxiety in some studies has been received with a degree of cynicism from researchers because women have reported they had endured a lot to have a child, and combined with feelings of gratitude, they may feel they have no right to complain (Fisher et al., 2007).

IVF partners feeling more controlled in their relationship could be a consequence of societal role expectations that promote support and protection of

the pregnant partner, combined with the additional demands normally ascribed to impending motherhood. These include a period of infertility; processes involved to achieve a pregnancy, the intense involvement in the pregnancy, and the risks of being disappointed if something went wrong, which reportedly lasted the whole pregnancy (Hjelmstedt et al., 2003b).

IVF couples had more difficulties coping after two or more treatment cycles. Other studies have also found the number of treatment cycles did not differ significantly across psychological measures, and that levels of anxiety were similar to control mothers, although IVF women's anxiety was directed at specific issues such as pregnancy security and foetal health (McMahon, 2003). Eugster and Vingerhoets (1999) found women who had conceived after two cycles of IVF were not significantly more anxious than IVF partners, but IVF mothers were more anxious than a comparison group of control mothers. Regardless of the number of cycles taken to become pregnant, the investment of resources in the process is emotionally and psychologically demanding, possibly for reasons previously stated (Cousineau & Domar, 2007).

According to recent research, women identified stress as an important problem during pregnancy but they did not regard it as a real illness because it is not physical (Jomeen, 2004). Jomeen (2004) recommended maternity services reconstruct the illness-focused model to one that facilitates the process of pregnancy to parenthood, incorporating psychological health issues. By addressing psychological health issues as a standard part of perinatal health care, potential "at risk" women (and men) could be supported and cared for to promote well being as they transition from pregnancy to parenthood. Further research is needed to consider subjective experiences of couples to provide realistic

pregnancy experiences, particularly those embarking on more complicated ARTs arrangements involving donor gametes and surrogacy (Jomeen, 2004).

This study found IVF partners felt more controlled in their relationships than IVF mothers regardless of the number of cycles taken to conceive which was not consistent with previous research regarding the types and duration of treatment, although few studies had examined the demands on non-pregnant partners during IVF pregnancies. Fisher et al. (2007) suggested women may seek more support from their partner in the absence of social and familial support afforded to women who conceive spontaneously as they find adjustment to pregnancy after ART difficult. Despite the additional demands placed on both mothers and partners, most studies indicated high levels of marital satisfaction and resilience in couples undergoing ARTs, and although unsuccessful treatment cycles predicted sadness, anger, and depression reactions, the process of undergoing infertility treatments significantly predicted positive marital adjustment (Repokari et al., 2007).

Responses from this study suggest IVF couples' pregnancy experiences through the latter part of pregnancy did not differ from non-IVF couples, and furthermore, mothers experienced similar levels of life satisfaction and well-being compared to partners. While many of the analyses conducted for this study failed to produce significant results, and these results were somewhat inconsistent with some other studies, the pregnancy experiences found in these IVF mothers was advantageous for their unborn babies. This may be a reflection of the quality of care received during ART treatment and the pregnancy process, based on comments received from study participants. If some women improve psychologically through the pregnancy, as suggested by other researchers, by

becoming less stressed and anxious, conversely, there may also be subgroups in ART populations who are more vulnerable to psychological difficulties in the transition to parenthood. This could indicate that it may be important for healthcare providers to give IVF couples opportunities to discuss their concerns during pregnancy.

Reliability of findings.

One of the strengths of this study was the similarity of the comparison group, which was matched on salient demographic characteristics to the sample group. The IVF group included women and their partners who had been treated with various forms of ARTs, including DI, as found in other recent studies. A large proportion (84%) of partners of IVF mothers chose to participate in the study which may reflect the high degree of involvement of partners in ART pregnancies.

The study was conducted on women predominantly in the third trimester of pregnancy, which is the period during pregnancy when the highest level of psychological symptoms occur for mood disturbance and anxiety (Fisher et al., 2007). Women in the study were advantaged, in that they were well educated and had relatively high socioeconomic status, living in supportive, affectionate, committed relationships, and also having pregnancies that were actively sought and desired. Whereas these socioeconomic factors are common to families conceiving through ARTs, other aspects of this study were less representative of an increasingly diverse social context that employed the use of this technology. The unborn children in this study were genetically related to at least one parent, representing traditional family structure, however, the application of donated

gametes and embryos to a range of alternate family contexts, including older couples and same-sex partnerships, require consideration (Michelle, 2006).

Recently, researchers have encouraged the inclusion of the cultural perspectives of ethnicities that constitute the NZ population, such as other Asian and Polynesian peoples. This research included families from a limited range of cultural backgrounds; New Zealanders of European descent/Pakeha, Maori, British and Chinese, which are similar in that they subscribe to the same kind of values pertaining to the use of assisted reproductive technologies and attitudes to parenting.

Limitations.

In this study there were several limiting factors relating to the size of the sample group, particularly the small number of control partners, in comparison with the IVF partners, and compared to those in the referenced literature. Combined with that was the homogeneity of the sample group, which has been frequently criticised in samples of IVF women. This may have been due to the recruitment area contained in a limited geographical zone, which could have been extended to include a larger population, although, the Waikato area is a region that is representative of New Zealand for population factors such as age, ethnicity and urban/rural mix. The mean age of the pregnant partners in the study was higher than the mean age of NZ mothers, and with regard to parent-presence, all the mothers were living with the other parent of their child. The IVF group also had associated advantages of higher levels of education and financial and domestic security, which are positive influences against potentially negative consequences of ARTs (McMahon et al., 2003).

Another limiting factor was that this study was a cross sectional analysis focused on group means that presented no indications of the extent of, for example, women's low mood or degree of anxiety. Although the distributions of very high and very low groups were examined, the IVF women were not significantly different to the non-IVF women, and the results were not reported.

Future studies.

Additional studies useful for understanding psychological responses to pregnancy after ARTs include longitudinal analysis of the groups from the beginning of treatment to the birth of the baby to gain a more complete picture of pregnancy experience, including levels of stress and anxiety, encountered by both partners throughout the transition to parenthood.

The quantitative results of this study could be enhanced by interviews of IVF couples that would enable a more comprehensive understanding of their unique perspective. Toscano and Montgomery (2009) reported women's feelings of being abandoned by the IVF team after transfer to midwifery and obstetric services and notes attached to the surveys attested to the positive experience gained from treatment at Fertility Associates, and the desire to remain there for continued care for the remainder of the pregnancy. Some studies commented on the need for pregnancies resulting from ARTs to be normalized and thereby allowing discussion about problems, rather than protecting the notion of idealized parenthood (McMahon et al., 2003). Casual comments during impromptu conversations at antenatal classes highlighted the continued stigmatization of assisted conceptions, with prompt reassurances from mothers who conceived spontaneously that a multiple pregnancy was "natural" rather than the result of technology. Future research could investigate aspects of ARTs that deem multiple

pregnancies as unnatural and may possibly inhibit disclosure to resulting children (Hjelmstedt et al., 2004).

Future studies could also include measures, such as Pregnancy experiences scale, that explored maternal perceptions of factors that contribute to stresses and anxiety in pregnancy such as baby's movement and reaction to changing body-shape. Other tests could take into account the effects of various treatments and numbers of cycles on the processes involved in the transition to parenthood, for example, foetal attachment.

Clinical implications of the study.

According to previous research, expectations were that couples, having undergone several cycles of ART treatment, remain stressed and anxious after the first trimester of pregnancy. That has not been apparent from this study because based on these findings, pregnancies were achieved in fewer than two treatment cycles, and IVF mothers' experiences of pregnancy did not differ from those of control mothers. These findings could be attributed to the psychological support offered at Fertility Associates and the quality of the information about the treatment process, according to feedback within the questionnaires. It was also reported anecdotally that further high quality information about the birth process and parenthood was gained via antenatal classes.

Future research could entail efforts to recruit a greater proportion of partners to participate in transition to parenthood studies. To gain additional insights, a qualitative component might have added personal perspectives to group analyses. Furthermore, examination of the pregnancy experiences of IVF women and partners during the time of conception until after the birth might enable

professionals and support staff to prepare clients for a better transition to parenthood.

Conclusions.

The main finding of this study is how resilient these ART couples are having experienced pregnancy similarly to spontaneously conceiving couples. They have persevered through a stressful and difficult experience to get pregnant, and having achieved that, they are managing their levels of stress and anxiety in a similar manner to couples who conceived spontaneously. These findings support previous research that shows couples who have conceived after ART treatments have adaptive processes to counter effects of stress and anxiety, but they may benefit from extended contact with the treatment clinic and further engagement with other couples to discuss pregnancy issues and future life as parents.

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Appendix A.

Letter to Fertility Associates (overleaf).

Department of Psychology,

Faculty of Arts and Social Sciences,

University of Waikato,

Private Bag 3105,

Hamilton.

22.6.09.

Fertility Associates,

Private Bag 28910,

Remuera,

Auckland 1541.

Dear Dr Peek,

Senior lecturers in the psychology department at the University of Waikato are conducting an exploratory study on prenatal complications and psychological stress. Because very little research has been conducted previously in New Zealand, this project will attempt to understand experiences of complications in pregnancy and identify factors that minimize distress, and also provide the basis of several student research projects for Masters theses. The research will focus on groups of pregnant women in the Waikato area, and their partners, to better understand and advocate for their psychosocial needs.

Some weeks ago Dr Carrie Barber and Dr Nicola Starkey, principle investigators in the research project, and me met with Dr Helen Wemyss to discuss the possibility of conducting a research project with women and their partners undergoing IVF. We also met with Sue Saunders, counsellor at Fertility Associates (Hamilton), who agreed this is a specific group of people with specific needs relating to the treatment they were undertaking.

Overseas research has highlighted the levels of stress, anxiety and quality of life experienced by IVF couples compared with couples who have conceived ‘naturally’, however, there is no information from New Zealand studies that suggests these couples may need additional services during and after the time of treatment.

In response to this, I am hoping to complement the larger perinatal study by recruiting a sample group of couples treated at Fertility Associates, and compare their emotional responses during pregnancy with couples recruited from hospital or community antenatal groups.

Please find an enclosed research proposal for my master's thesis which is sent for your approval.

Yours faithfully,

Elizabeth Clausen.

Appendix B

Cover letter and instructions to IVF mothers after telephone contact from Fertility Association.

Department of Psychology

The University of Waikato

Private Bag 3105

Hamilton, New Zealand

Telephone 64-7-856 2889

Facsimile 64-7-858 5132

October, 2009.

Dear Participant,

Recently Sue Saunders, the Counsellor from Fertility Associates, will have contacted you about taking part in a research project. A group of researchers from the University of Waikato is working with staff at Fertility Associates, Waikato Hospital, and local midwives on a project to help us understand how stress affects women during pregnancy, and how women cope with medical problems during pregnancy. This part of the project is aiming to understand how stress affects women and their partners who have undergone IVF treatment. We would like you to take part in this project, which involves filling in some questionnaires (enclosed), or completing them online, if you prefer (http://psychology.waikato.ac.nz/surveys/ivf/index.htm). We are asking women and their partners who have been treated with IVF, and women and their partners who have conceived naturally, so we can compare both groups.

The questionnaires ask about your pregnancy, health care, and thoughts and feelings about relationships, stress, anxiety, and mood. The questionnaires take about 20 minutes. You are free to decide not to participate, or to not answer any particular questions, or to stop at any time.

These forms won't become part of your medical record at Fertility Associates, and the information you give to us will be sent back to the University, where it will be kept private, and will in no way affect the care you receive now or in the future.

In the project, your questionnaires are labelled only with an ID number, so your names will not be on the forms you fill out or the computer files. No material which could personally identify you will be used in any reports on this study.

We would also like to ask your partner to participate. There is a similar set of forms for your partner to fill in (enclosed). You and your partner are always free to decide not to participate, either now, or at any time during the study, and you and your partner may decide whether or not to participate independently.

This study has been reviewed and approved by Fertility Associates, the Northern Y Ethics Committee, and the University of Waikato, Department of Psychology Ethics Committee. If you have any concerns or questions about your rights as a participant in this research study you can contact an independent health and disability advocate. This is a free service provided under the Health and Disability Commissioner Act, and can be accessed by calling 0800 555 050.

We really appreciate your time and thoughts if you decide to help with this study- we hope that it will help us understand and care for the needs of women and their partners who have been treated with IVF. *If you would like further information about the study, before you decide to participate, please contact Dr Nicola Starkey email:* nstarkey@waikato.ac.nz *or Tel 07 838 4466 ext 6472.*

Yours sincerely,

Dr Carrie Barber, Dr Nicola Starkey & Elizabeth Clausen

Instructions for filling in forms

- Please answer these questions in private, without consulting with a partner or anyone else—we want your personal, private feelings and opinions.
- Please be as honest as you can be—there are no wrong answers, and you won't be judged for what you put down. The more accurate information we get, the better we can understand and help with people's problems in the future.
- If you aren't sure, just try to give the closest or best answer you can
- You don't have to answer all the questions—if something bothers you, you can skip it—but it is helpful if you try your best to answer all you can.
- You'll see that the forms have a number on them—that's your ID. **Please don't put your name on any of the forms.**
- When you've finished the questionnaires, please put them in the prepaid envelope and post it.
- If you have questions, please call Nicola at 07 838 4466 ext 6472.

If you prefer to fill in the forms online:

- Online, go to http://psychology.waikato.ac.nz/surveys/ivf/index.htm
- If you have read that and have no questions, and agree to take part, click on the box indicated
- You will be given instructions about how to create an ID that can link to your partner's ID
- Complete the questionnaires

Creating an ID

The information you provide will be identified by an ID number, rather than a name. We would like to be able to match up these ID numbers between partners who are both participating in the study, while still preserving them as unique ID's that are not identifiable.

Please make up your unique ID using the following three parts:

Part one: The last four digits of **the pregnant partner's** home phone (landline) if she has one. If she does not have a landline, the last four digits of her mobile phone

If her phone number is 838 5987, use 5987

If she has only a mobile phone, and it is 021 585 404, use 5404

Part two: The number part of **the pregnant partner'**s street address including street number (first) and unit or flat number, if applicable. Do not include letters, even if they are a part of the address

If she lives at 320 Lovely Lane, use 320

If she lives at 1433A Serenity Circle, use 1433

If she lives at 123 Victoria Street, flat 358, use 123358

Part three: Pregnant mother, add the letter M; for the partner, add the letter P

My ID number would be 8697116M, because my phone number ends in 8697, my address is 116, and I'm the mother…my partner's ID would be 8697116P, ***even if he has a different phone number or address****—the ID is made up from the pregnant partner's information, so they match.*

If you would prefer to make up an ID number that does not contain these elements, and are able to communicate to your partner so that you both give us the same number, that will be fine. In that case, please create an ID with M (for mother) or P (for partner) <u>first</u>, then at least six numbers of your choice, using the same numbers as your partner.

Appendix C

Background information form and battery of tests for participant.

ID:…….

Mother's Background Information

Thank you very much for completing these forms. Please feel free to write in comments as you go, if you wish. There is a place for general comments/thoughts at the end.

Current Date:_____

Your Age: _____

Gestation of this pregnancy (# weeks currently):_____

Your ethnicity (please circle all that apply):

NZ Maori / NZ European / Other European *(please specify)*:_____ /Samoan /

Cook Island Maori / Tongan / Niuean / Chinese / Indian / Other *(please specify)*:_____

What is the highest qualification you have completed?

_____

What was your most recent paid work?

_____

Relationship Status (please circle one): Single / separated / divorced / de facto / married / widowed

If you have a current partner:

How long have you been in this relationship? _____years

What is your partner's highest qualification completed?

_____

What type of work does your partner do now?

_____

Approximate total household income over the *last 12 months*:

a. 20,000 or less
b. 20,001-30,000
c. 30,0001-50,000
d. 50,001-70,000
e. 70,001-100,000

f. 100,001 or more

How many children currently live with you?_____

Ages of children in your home:_____

How many other adults live with you now, including your partner, if you are living with one?_____

ID:…….

Previous pregnancy and parenting history:

How many times have you been pregnant before this time?_____

Have you ever had any experiences of

a. Miscarriage:_____(number)
b. Abortion:_____ (number)
c. Stillbirth:_____(number)
d. Live birth:_____(number)
e. Given up a child for adoption:_____(number)
f. Adopted a child:_____(number)
g. Stepparent to a child:_____(number)

What type of infertility treatment have you had? (please circle any that apply).

a. Extensive infertility treatment other than IVF
b. IVF (# of cycles)_____
c. IVF + ICSI
d. IVF + DI
e. TER

Health history

How would you rate your health before this pregnancy?

a. Very good
b. Good
c. Ok, some minor problems
d. Ongoing health concerns that required treatment (e.g., stable diabetes, asthma)
e. Serious health concerns (e.g., cancer, brittle diabetes)

How would you rate your health during this pregnancy, in the last week?

a. Healthy, no medical problems
b. Mild medical problems that aren't any risk to me and/or the baby
c. Moderate medical problems that require some monitoring by a midwife or doctor
d. Major medical problems that require intervention or create some risk
e. Severe medical problems that are a significant risk to me and/or the baby

How would you rate your health during this pregnancy, before the last week?

a. Healthy, no medical problems
b. Mild medical problems that aren't any risk to me and/or the baby
c. Moderate medical problems that require some monitoring by a midwife or doctor
d. Major medical problems that require intervention or create some risk
e. Severe medical problems that are a significant risk to me and/or the baby

Have you experienced any of the following problems:

	Before this pregnancy	During this pregnancy
High blood sugar (diabetes)		
Vaginal bleeding (not menstruation)		
Kidney or bladder or UTI infection		
Severe nausea, vomiting or dehydration		
High blood pressure, hypertension		
Problems with the placenta (previa, abruption)		
Preterm or early labour		
Water broke too early		
Blood transfusion		
Injured in a car or other serious accident		
Depression or anxiety for which you got treatment		

Experiences in *this* pregnancy

What was your experience in finding a midwife/LMC?

a. Easy, no problems
b. Some difficulty finding one I wanted—e.g., had to call 2 or 3 before finding one
c. Difficulty finding one I wanted—e.g., had to call 4-6 before finding one
d. Serious difficulty finding one—e.g., had to call more than 6

How would you rate your care with your LMC during this pregnancy?

a. Excellent
b. Good
c. Fair
d. Poor
e. Very poor

Since being discharged from Fertility Associates, have you had any medical consultations for this pregnancy by a health professional other than your LMC? (please circle all that apply)

a. No
b. Another midwife or LMC standing in for mine when s/he was not available
c. Visit with GP
d. Visit with specialist obstetrician
e. Visit to A & E department (#_____)
f. Inpatient hospital admission at Waikato Hospital (#_____)
g. Inpatient hospital services at another hospital (#_____)

Comments on maternity care or experiences with pregnancy or health care system:

Next, there are a series of questionnaires about your thoughts, feelings, relationships, and experiences.

We really appreciate your taking the time to fill these in and tell us about yourself.

Brief Pregnancy Experiences Scale (revised)

Below is a list of things you may experience during pregnancy that may affect you in a variety of ways. They may make you feel happy, positive, and uplifted, or they may make you feel unhappy, negative, or upset, or some of each. Please respond to each item, rating **both** how much it made you feel **happy** and how much it made you feel **unhappy**.

Happy, positive, or uplifted:					**Unhappy, negative, or upset:**			
0 Not at all	1 Some what	2 Quite a bit	3 A great deal		0 Not at all	1 Some what	2 Quite a bit	3 A great deal
				1) How much the baby is moving				
				2) Discussions with spouse/partner/family about baby names				
				3) Comments from others about your pregnancy/appearance				
				4) Making or thinking about nursery arrangements				
				5) Feelings about being pregnant at this time				
				6) Visits to midwife/obstetrician				
				7) Spiritual feelings about being pregnant				
				8) Courtesy/assistance from others because you are pregnant				
				9) Thinking about the baby's appearance				
				10) Discussions with spouse/partner/family about pregnancy/childbirth issues				
				11) Getting enough sleep				
				12) Physical intimacy				
				13) Normal discomforts of pregnancy (heartburn, incontinence)				
				14) Your weight				
				15) Body changes during pregnancy				
				16) Thoughts about whether the baby is normal				
				17) Thinking about your labour and delivery				
				18) Ability to do physical tasks/chores				
				19) Concerns about physical symptoms (pain, spotting, etc.)				
				20) Clothes/shoes don't fit				

(PSS) The questions in this scale ask you about your feelings and thoughts during the last **month**. In each case, please indicate with a tick how often you felt or thought a certain way.

In the last month,	0 Never	1 Almost never	2 Some times	3 Fairly often	4 Very often
1. ..how often have you been upset because of something that happened unexpectedly?					
2… how often have you felt that you were unable to control the important things in your life?					
3…how often have you felt nervous or "stressed"?					
4… how often have you felt confident about your ability to handle your personal problems?					
5…how often have you felt that things were going your way?					
6… how often have you found that you could not cope with all the things you had to do?					
7…how often have you been able to control irritations in your life?					
8…how often have you felt that you were on top of things?					
9…how often have you been angered because of things that were outside of your control?					
10… how often have you felt difficulties were piling up so high that you could not overcome them?					

A number of statements which people have used to describe themselves are given below. Read each statement and then tick the appropriate box 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.

STAI-S	Not at all	Somewhat	Moderately so	Very much so
1. I feel calm				
2. I feel secure				
3. I am tense				
4. I feel strained				
5. I feel at ease				
6. I feel upset				
7. I am presently worrying over possible misfortunes				
8. I feel satisfied				
9. I feel frightened				
10. I feel comfortable				
11. I feel self-confident				
12. I feel nervous				
13. I am jittery				
14. I feel indecisive				
15. I am relaxed				
16. I feel content				
17. I am worried				
18. I feel confused				
19. I feel steady				
20. I feel pleasant				

A number of statements which people have used to describe themselves are given below. Read each statement and then tick the appropriate box to the right of the statement to indicate how you ***generally feel.***

STAI-T	Almost never	Sometimes	Often	Almost always
21. I feel pleasant				
22. I feel nervous and restless				
23. I feel satisfied with myself				
24. I wish I could be as happy as others seem to be				
25. I feel like a failure				
26. I feel rested				
27. I am "calm, cool, and collected"				
28. I feel that difficulties are piling up so that I cannot overcome them				
29. I worry too much over something that really doesn't matter				
30. I am happy				
31. I have disturbing thoughts				
32. I lack self-confidence				
33. I feel secure				
34. I make decisions easily				
35. I feel inadequate				
36. I am content				
37. Some unimportant thought runs through my mind and bothers me				
38. I take disappointments so keenly that I can't put them out of my mind				
39. I am a steady person				
40. I get in a state of tension or turmoil as I think over my recent concerns and interests				

EPDS

Please mark the answer for each question that comes closest to how you have felt in the past week, not just how you feel today.

IN THE PAST WEEK,

1. I have been able to laugh and see the funny side of things
    a. As much as I always could
    b. Not quite so much now
    c. Definitely not so much now
    d. Not at all
2. I have looked forward with enjoyment to things
    a. As much as I ever did
    b. Rather less than I used to
    c. Definitely less than I used to
    d. Hardly at all
3. I have blamed myself unnecessarily when things go wrong
    a. Yes, most of the time
    b. Yes, some of the time
    c. Not very often
    d. No, never

4. I have been anxious or worried for no good reason
    a. No, not at all
    b. Hardly ever
    c. Yes, sometimes
    d. Yes, very often
5. I have felt scared or panicky for no very good reason
    a. Yes, quite a lot
    b. Yes, sometimes
    c. No, not much
    d. No, not at all
6. Things have been getting on top of me
    a. Yes, most of the time I haven't been able to cope at all
    b. Yes, sometimes I haven't been coping as well as usual
    c. No, most of the time I have coped quite well
    d. No, I have been coping as well as ever
7. I have been so unhappy that I have had difficulty sleeping
    a. Yes, most of the time
    b. Yes, sometimes
    c. Not very often
    d. No, not at all
8. I have felt sad or miserable
    a. Yes, most of the time
    b. Yes, quite often
    c. Not very often
    d. No, not at all
9. I have been so unhappy that I have been crying
    a. Yes, most of the time
    b. Yes, quite often
    c. Only occasionally
    d. No, never

10. The thought of harming myself has occurred to me
    a. Yes, quite often
    b. Sometimes
    c. Hardly ever
    d. Never

X

This questionnaire lists some attitudes and behaviors which people reveal in their close relationships. Please judge your partner's attitudes and behavior towards you in recent times and tick the most appropriate box for each item.

If you don't have a current partner, tick here (___) and go to the next questionnaire.

IBM	1 Very True	2 Moderately True	3 Somewhat True	4 Not True at all
1. Is very considerate of me				
2. Wants me to take his/her side in an argument				
3. Wants to know exactly what I'm doing and where I am				
4. Is a good companion				
5. Is affectionate to me				
6. Is clearly hurt if I don't accept his/her views				
7. Tends to try and change me				
8. Confides closely in me				
9. Tends to criticise me over small issues				
10. Understands my problems and worries				
11. Tends to order me about				
12. Insists that I do exactly as I'm told				
13. Is physically gentle and considerate				
14. Makes me feel needed				
15. Wants me to change in small ways				
16. Is very loving to me				
17. Seeks to dominate me				
18. Is fun to be with				
19. Wants to change me in big ways				
20. Tends to control everything I do				
21. Shows his/her appreciation of everything I do				
22. Is critical of me in private				
23. Is gentle and kind to me				
24. Speaks to me in a warm and friendly voice				

When things aren't going well for you, or when you're having problems, how *confident or certain* are you that you can do the following:

Cannot do at all **Moderately certain can do** **Certain can do**

0 1 2 3 4 5 6 7 8 9 10

For each of the following items, write a number from 0 - 10, using the scale above.

CSES	Rating 1-10
1. Keep from getting down in the dumps	
2. Talk positively to yourself	
3. Sort out what can be changed, and what cannot be changed	
4. Get emotional support from friends and family	
5. Find solutions to your most difficult problems	
6. Break an upsetting problem down into smaller parts	
7. Leave options open when things get stressful	
8. Make a plan of action and follow it when confronted with a problem	
9. Develop new hobbies or recreations	
10. Take your mind off unpleasant thoughts	
11. Look for something good in a negative situation	
12. Keep from feeling sad	
13. See things from the other person's point of view during a heated argument	
14. Try other solutions to your problems if you first solutions don't work	
15. Stop yourself from being upset by unpleasant thoughts	
16. Make new friends	
17. Get friends to help you with the things you need	
18. Do something positive for yourself when you are feeling discouraged	
19. Make unpleasant thoughts go away.	
20. Think about one part of the problem at a time	
21. Visualize a pleasant activity or place	
22. Keep yourself from feeling lonely	
23. Pray or meditate	
24. Get emotional support from community organizations or resources	
25. Stand your ground and fight for what you want.	
26. Resist the impulse to act hastily when under pressure	

Please read each item and tick the column that best describes how satisfied you are at this time. Please answer each item even if you do not currently participate in an activity or have a relationship. You can be satisfied or dissatisfied with not doing the activity or having the relationship.

QOL	7 Delighted	6 Pleased	5 Mostly Satisfied	4 Mixed	3 Mostly Dissatisfied	2 Unhappy	1 Terrible
1. Material comforts--home, food, conveniences, financial security							
2. Health—being physically fit and vigorous							
3. Relationships with parents, siblings & other relatives—communicating, visiting, helping							
4. Having and rearing children							
5. Close relationships with spouse or significant other							
6. Close friends							
7. Helping and encouraging others, volunteering, giving advice							
8. Participating in organizations and public affairs							
9. Learning—attending school, improving understanding, getting additional knowledge							
10. Understanding yourself—knowing your assets and limitations—knowing what life is about							
11. Work—job or in home							
12. Expressing yourself creatively							
13. Socializing—meeting other people, doing things, parties, etc.							
14. Reading, listening to music, or observing entertainment							
15. Participating in active recreation							
16. Independence, doing for yourself							

Thank you for your participation.

A summary of the research findings will be posted on the Fertility Associates website near the end of 2010.

Draw for Gift Voucher

We appreciate the time and thought you've put into this project. Unfortunately, we don't have the funds to give something to everyone to thank them for their time, but we have some funds for thank-you's, so we are able to give away some gift vouchers.

If you would like to be entered in a draw for a $60 gift voucher, please fill in the form below. It will be put in with the other forms returned that month, and each month one will be drawn randomly, and the gift voucher will be posted to the winner.

Please return this form in the envelope with your questionnaires and consent. It will be separated and put in the draw.

Name: _____

Address:_____

_____

Contact for Follow-up Study

We are hoping to be able to do a follow-up study that might look at how parents and babies are doing down the road. If you might be interested in participating in that follow-up study, we would appreciate you providing some contact details now, so that we can find you later to tell you about what we are planning and ask you to participate. **This is not a consent to participate in that study**—this is just permission to contact you and tell you about it, and ask then if you would like to be involved.

If you are willing to be contacted by someone from the research team at a later date, please provide the following:

ID:_____

Name:_____

Postal Address: Street:_____

City/suburb:_____

Phone numbers: (please circle the one where you'd prefer to be called)

Home:_____

Mobile:_____

Work:_____

Other:_____

e-mail address:_____

Summary of Research Findings

If you would like us to send you a summary of the research findings after the study is complete, please provide your mailing and/or e-mail address below:

Name:_____

Postal Address: Street:_____

City/suburb:_____

OR

e-mail:_____

Support Resources for Families

- 0800-MUM-2-BE (0800-686-223): An information line explaining how the maternity system works, including how to find a Lead Maternity Carer (LMC).
- ALCOHOL HELPLINE (0800-787-797): Help and advice for concerns about problem drinking.
- CITIZENS' ADVICE BUREAU (07-839-0395): Able to provide information on most local organizations. Check with this group to find out about new community support services.
- CRISIS ASSESSMENT AND TREATMENT (CAT) TEAM (0800-50-50-50): Available 24-hours, 7 days per week for mental health emergencies.
- HAMILTON WOMEN'S REFUGE (07) 855 1569 (24hrs): Help for women dealing with domestic violence.
- HEALTHLINE (0800-611-116): A 24-hour telephone health service.
- LIFELINE (0800) LIFELINE or (0800 543 354): 24-hour telephone counseling service
- NEST, SALVATION ARMY (07-843-4509; corner of Kahikatea Drive and Ohaupo Road, Hamilton): Community and family services, early childhood education, crèche, social services.
- PARENT-LINE (07-839-4536): Support for parents under stress. Parenting groups, anger management, domestic survival groups, Keeping Ourselves Safe programme, one-to-one counselling, and family therapy are some of the services offered.
- PLUNKET LINE (0800-933-922): Offers a 24-hour service with advice on child health and development.
- RELATIONSHIP SERVICES WHAKAWHANAUINGATANGA (07-839-3267; or 0800 RELATE): Relationship skills, counselling, effective parenting, effective communication.
- WAIKATO FAMILY CENTRE (07-834-2036; Radnor Street, Hamilton): Professional advice for mothers. Free advice and options given to mothers of unsettled babies as well as advice with breastfeeding, crying, colic, sleeping, reflux, bottle feeding, post-natal distress, and parenting skills. Phone first to discuss the problem. Cots and beds provided for hands-on assistance with infants.

Internet Resources:

- www.webhealth.co.nz: provides information on services available, searchable by specific problem and region
- www.everybody.co.nz: Information on a variety of health and mental health problems and services in New Zealand
- www.parentscentre.org.nz: information on Parents Centres, which provide support and information for parents throughout New Zealand

Appendix D

Partner information sheet, demographics and questionnaires.

Stress and IVF Pregnancy Project

Partner Information Sheet

A group of researchers from the University of Waikato is working with staff at Fertility Associates, staff at Waikato Hospital and local midwives on a project to help us understand how stress affects women during pregnancy, and how women and their partners cope with pregnancy-related medical problems. We would like to ask you to participate in this project, which involves filling in some questionnaires (or responding online, if you prefer, http://psychology.waikato.ac.nz/surveys/ivf/ivfsurvey.htm).

Your partner has been asked if she would like to participate by filling in forms about her health, experiences, and feelings. We would also like to know about your experiences and feelings during this pregnancy. We've made up a packet of questionnaires that ask about stress, relationships, anxiety, depression, and health. They should take about 15 minutes to fill out.

These forms won't become part of your partner's medical record, and we will keep the information you give to us private. In the project, you are given an ID number, so your name will not be on the forms you fill out or on the computer files.

If you would rather fill in the questionnaires online, you may do so; please follow the instructions on the attached "Directions for completing forms online".

You and your partner are always free to decide not to participate, either now, or at any time during the study. Whether or not you participate won't have any effect on your partner's prenatal or other medical care, and you and your partner may decide or not to participate independently- you do not have to participate because she has, nor does she have to if you do.

This study has been reviewed and approved by Fertility Associates, the Northern Y Ethics Committee, and the University of Waikato, Department of Psychology Ethics Committee. If you have any questions or concerns about your rights as a participant in this research study you can contact an independent health and disability advocate. This is a free service provided under the Health and Disability Commissioner Act, and can be accessed by calling 0800 555 050.

We really appreciate your time and thoughts if you decide to help with the study- we hope that it will help us to understand and care for the needs of pregnant women and their families.

If you have any questions about the study at any time, please feel free to call the lead researcher, Nicola Starkey, at 07 838 4466 ext 6472, or email nstarkey@waikato.ac.nz

Instructions for filling in forms

Partner forms

- First, read the information sheet.
    - If you have any questions, call 07 838 4466 ext 6472.
- Please answer these questions in private, without consulting with a partner or anyone else—we want your personal, private feelings and opinions.
- Please be as honest as you can be—there are no wrong answers, and you won't be judged for what you put down. The more accurate information we get, the better we can understand and help with people's problems in the future.
- If you aren't sure, just try to give the closest or best answer you can
- You don't have to answer all the questions—if something bothers you, you can skip it—but it is helpful if you try your best to answer all you can.
- You'll see that the forms have a number on them—that's your ID. **Please don't put your name on any of the forms.**
- When you've finished the questionnaires, please put them in the envelope provided post them directly to us.
- If you have questions, please call Nicola at 07 838 4466 ext 6472.

If you prefer to fill in the forms online:

- Online, go to http://psychology.waikato.ac.nz/surveys/ivf/index.htm and click on the link that says "partner information sheet".
- If you have read that and have no questions, and agree to take part, click on the box indicated
- You will be asked to create an ID that can be linked to your partner's ID; please follow those instructions carefully, or talk with your partner about her ID
- Complete the questionnaires
- You do not need to complete a paper consent form

Creating an ID

The information you provide will be identified by an ID number, rather than a name. We would like to be able to match up these ID numbers between partners who are both participating in the study, while still preserving them as unique ID's that are not identifiable.

Please make up your unique ID using the following three parts:

Part one: The last four digits of **the pregnant partner's** home phone (landline) if she has one. If she does not have a landline, the last four digits of her mobile phone

If her phone number is 838 5987, use 5987

If she has only a mobile phone, and it is 021 585 404, use 5404

Part two: The number part of **the pregnant partner'**s street address including street number (first) and unit or flat number, if applicable. Do not include letters, even if they are a part of the address

If she lives at 320 Lovely Lane, use 320

If she lives at 1433A Serenity Circle, use 1433

If she lives at 123 Victoria Street, flat 358, use 123358

Part three: Pregnant mother, add the letter M; for the partner, add the letter P

My ID number would be 8697116M, because my phone number ends in 8697, my address is 116, and I'm the mother…my partner's ID would be 8697116P, ***even if he has a different phone number or address****—the ID is made up from the pregnant partner's information, so they match.*

If you would prefer to make up an ID number that does not contain these elements, and are able to communicate to your partner so that you both give us the same number, that will be fine. In that case, please create an ID with M (for mother) or P (for partner) first, then at least six numbers of your choice, using the same numbers as your partner.

ID:……

Partners Background Information

Thank you very much for completing these forms. Please feel free to write in comments as you go, if you wish. There is a place for general comments/thoughts at the end.

Date:_____

Your Age: _____ Gender (please circle): Male / Female

Your ethnicity (please circle all that apply):

NZ Maori / NZ European / Other European *(please specify)*:_____

Samoan / Cook Island Maori / Tongan / Niuean / Chinese / Indian

Other *(please specify)*:_____

Previous pregnancy and parenting history:

How many times has your partner (current or former) been pregnant before this time?_____

Have you ever had any experiences of--

h. Miscarriage:_____(number)
i. Abortion:_____ (number)
j. Stillbirth:_____(number)
k. Live birth:_____(number)
l. Given up a child for adoption:_____(number)
m. Adopted a child:_____(number)
n. Stepparent to a child:_____(number)
o. Partner got pregnant but I had no further involvement:_____(number)

Health history

How would you rate your own health?

f. Very good
g. Good
h. Ok, some minor problems
i. Ongoing health concerns that required treatment (e.g., stable diabetes, asthma)
j. Serious health concerns (e.g., cancer, brittle diabetes)

How would you rate your partner's health during this pregnancy, before the last week?

a. Healthy, no medical problems
b. Mild medical problems that aren't any risk to her and/or the baby
c. Moderate medical problems that require some monitoring by a midwife or doctor
d. Major medical problems that require intervention or create some risk
e. Severe medical problems that are a significant risk to her and/or the baby

How would you rate your partner's health during this pregnancy, in the last week?

a. Healthy, no medical problems
b. Mild medical problems that aren't any risk to her and/or the baby
c. Moderate medical problems that require some monitoring by a midwife or doctor
d. Major medical problems that require intervention or create some risk
e. Severe medical problems that are a significant risk to her and/or the baby

How would you rate your partner's care with her Lead Maternity Caregiver (midwife or doctor) during this pregnancy?

a. Excellent
b. Good
c. Fair
d. Poor
e. Very poor

Comments on maternity care or experiences with pregnancy or health care system:

Next, there are a series of questionnaires about your thoughts, feelings, relationships, and experiences.

We really appreciate your taking the time to fill these in and tell us about yourself.

(PSS) The questions in this scale ask you about your feelings and thoughts during the last **month**. In each case, please indicate with a tick how often you felt or thought a certain way.

In the last month,	0 Never	1 Almost never	2 Some times	3 Fairly often	4 Very often
1. ..how often have you been upset because of something that happened unexpectedly?					
2… how often have you felt that you were unable to control the important things in your life?					
3…how often have you felt nervous or "stressed"?					
4… how often have you felt confident about your ability to handle your personal problems?					
5…how often have you felt that things were going your way?					
6… how often have you found that you could not cope with all the things you had to do?					
7…how often have you been able to control irritations in your life?					
8…how often have you felt that you were on top of things?					
9…how often have you been angered because of things that were outside of your control?					
10… how often have you felt difficulties were piling up so high that you could not overcome them?					

A number of statements which people have used to describe themselves are given below. Read each statement and then tick the appropriate box 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.

STAI-S	Not at all	Some what	Moderately so	Very much so
1. I feel calm				
2. I feel secure				
3. I am tense				
4. I feel strained				
5. I feel at ease				
6. I feel upset				
7. I am presently worrying over possible misfortunes				
8. I feel satisfied				
9. I feel frightened				
10. I feel comfortable				
11. I feel self-confident				
12. I feel nervous				
13. I am jittery				
14. I feel indecisive				
15. I am relaxed				
16. I feel content				
17. I am worried				
18. I feel confused				
19. I feel steady				
20. I feel pleasant				

A number of statements which people have used to describe themselves are given below. Read each statement and then tick the appropriate box to the right of the statement to indicate how you ***generally feel.***

STAI-T	Almost never	Sometimes	Often	Almost always
21. I feel pleasant				
22. I feel nervous and restless				
23. I feel satisfied with myself				
24. I wish I could be as happy as others seem to be				
25. I feel like a failure				
26. I feel rested				
27. I am “calm, cool, and collected”				
28. I feel that difficulties are piling up so that I cannot overcome them				
29. I worry too much over something that really doesn’t matter				
30. I am happy				
31. I have disturbing thoughts				
32. I lack self-confidence				
33. I feel secure				
34. I make decisions easily				
35. I feel inadequate				
36. I am content				
37. Some unimportant thought runs through my mind and bothers me				
38. I take disappointments so keenly that I can’t put them out of my mind				
39. I am a steady person				
40. I get in a state of tension or turmoil as I think over my recent concerns and interests				

ID:.....
EPDS

Please mark the answer for each question that comes closest to how you have felt in the past week, not just how you feel today.

IN THE PAST WEEK,

11. I have been able to laugh and see the funny side of things
    a. As much as I always could
    b. Not quite so much now
    c. Definitely not so much now
    d. Not at all
12. I have looked forward with enjoyment to things
    a. As much as I ever did
    b. Rather less than I used to
    c. Definitely less than I used to
    d. Hardly at all
13. I have blamed myself unnecessarily when things go wrong
    a. Yes, most of the time
    b. Yes, some of the time
    c. Not very often
    d. No, never
14. I have been anxious or worried for no good reason
    a. No, not at all
    b. Hardly ever
    c. Yes, sometimes
    d. Yes, very often
15. I have felt scared or panicky for no very good reason
    a. Yes, quite a lot
    b. Yes, sometimes
    c. No, not much
    d. No, not at all
16. Things have been getting on top of me
    a. Yes, most of the time I haven't been able to cope at all
    b. Yes, sometimes I haven't been coping as well as usual
    c. No, most of the time I have coped quite well
    d. No, I have been coping as well as ever
17. I have been so unhappy that I have had difficulty sleeping
    a. Yes, most of the time
    b. Yes, sometimes
    c. Not very often
    d. No, not at all
18. I have felt sad or miserable
    a. Yes, most of the time
    b. Yes, quite often
    c. Not very often
    d. No, not at all
19. I have been so unhappy that I have been crying
    a. Yes, most of the time
    b. Yes, quite often
    c. Only occasionally
    d. No, never

20. The thought of harming myself has occurred to me
    a. Yes, quite often
    b. Sometimes
    c. Hardly ever
    d. Never

X

This questionnaire lists some attitudes and behaviors which people reveal in their close relationships. Please judge your partner's attitudes and behavior towards you in recent times and tick the most appropriate box for each item.

If you don't have a current partner, tick here (___) and go to the next questionnaire.

IBM	1 Very True	2 Moderately True	3 Somewhat True	4 Not True at all
1. Is very considerate of me				
2. Wants me to take his/her side in an argument				
3. Wants to know exactly what I'm doing and where I am				
4. Is a good companion				
5. Is affectionate to me				
6. Is clearly hurt if I don't accept his/her views				
7. Tends to try and change me				
8. Confides closely in me				
9. Tends to criticise me over small issues				
10. Understands my problems and worries				
11. Tends to order me about				
12. Insists that I do exactly as I'm told				
13. Is physically gentle and considerate				
14. Makes me feel needed				
15. Wants me to change in small ways				
16. Is very loving to me				
17. Seeks to dominate me				
18. Is fun to be with				
19. Wants to change me in big ways				
20. Tends to control everything I do				
21. Shows his/her appreciation of everything I do				
22. Is critical of me in private				
23. Is gentle and kind to me				
24. Speaks to me in a warm and friendly voice				

When things aren't going well for you, or when you're having problems, how *confident or certain* are you that you can do the following:

Cannot do at all **Moderately certain can do** **Certain can do**

0 1 2 3 4 5 6 7 8 9 10

For each of the following items, write a number from 0 - 10, using the scale above.

CSES	Rating 1-10
1. Keep from getting down in the dumps	
2. Talk positively to yourself	
3. Sort out what can be changed, and what cannot be changed	
4. Get emotional support from friends and family	
5. Find solutions to your most difficult problems	
6. Break an upsetting problem down into smaller parts	
7. Leave options open when things get stressful	
8. Make a plan of action and follow it when confronted with a problem	
9. Develop new hobbies or recreations	
10. Take your mind off unpleasant thoughts	
11. Look for something good in a negative situation	
12. Keep from feeling sad	
13. See things from the other person's point of view during a heated argument	
14. Try other solutions to your problems if you first solutions don't work	
15. Stop yourself from being upset by unpleasant thoughts	
16. Make new friends	
17. Get friends to help you with the things you need	
18. Do something positive for yourself when you are feeling discouraged	
19. Make unpleasant thoughts go away.	
20. Think about one part of the problem at a time	
21. Visualize a pleasant activity or place	
22. Keep yourself from feeling lonely	
23. Pray or meditate	
24. Get emotional support from community organizations or resources	
25. Stand your ground and fight for what you want.	
26. Resist the impulse to act hastily when under pressure	

Please read each item and tick the column that best describes how satisfied you are at this time. Please answer each item even if you do not currently participate in an activity or have a relationship. You can be satisfied or dissatisfied with not doing the activity or having the relationship.

QOL	7 Delighted	6 Pleased	5 Mostly Satisfied	4 Mixed	3 Mostly Dissatisfied	2 Unhappy	1 Terrible
1. Material comforts--home, food, conveniences, financial security							
2. Health—being physically fit and vigorous							
3. Relationships with parents, siblings & other relatives—communicating, visiting, helping							
4. Having and rearing children							
5. Close relationships with spouse or significant other							
6. Close friends							
7. Helping and encouraging others, volunteering, giving advice							
8. Participating in organizations and public affairs							
9. Learning—attending school, improving understanding, getting additional knowledge							
10. Understanding yourself—knowing your assets and limitations—knowing what life is about							
11. Work—job or in home							
12. Expressing yourself creatively							
13. Socializing—meeting other people, doing things, parties, etc.							
14. Reading, listening to music, or observing entertainment							
15. Participating in active recreation							
16. Independence, doing for yourself							

Thank you for your participation.

A summary of the research findings will be posted on the Fertility Associates website near the end of 2010.

Draw for Gift Voucher

We appreciate the time and thought you've put into this project. Unfortunately, we don't have the funds to give something to everyone to thank them for their time, but we have some funds for thank-you, so we are able to give away some gift vouchers.

If you would like to be entered in a draw for a $60 gift voucher, please fill in the form below. It will be put in with the other forms returned that month, and each month one will be drawn randomly, and the gift voucher will be posted to the winner.

Please return this form in the envelope with your questionnaires and consent. It will be separated and put in the draw.

Name: _____

Address:_____

_____

Contact for Follow-up Study

We are hoping to be able to do a follow-up study that might look at how parents and babies are doing down the road. If you might be interested in participating in that follow-up study, we would appreciate you providing some contact details now, so that we can find you later to tell you about what we are planning and ask you to participate. **This is not a consent to participate in that study**—this is just permission to contact you and tell you about it, and ask then if you would like to be involved.

If you are willing to be contacted by someone from the research team at a later date, please provide the following:

ID:_____

Name:_____

Postal Address: Street:_____

City/suburb:_____

Phone numbers: (please circle the one where you'd prefer to be called)

Home:_____

Mobile:_____

Work:_____

Other:_____

e-mail address:_____

Summary of Research Findings

If you would like us to send you a summary of the research findings after the study is complete, please provide your mailing and/or e-mail address below:

Name:_____

Postal Address: Street:_____

City/suburb:_____

OR

e-mail:_____

Support Resources for Families

- 0800-MUM-2-BE (0800-686-223): An information line explaining how the maternity system works, including how to find a Lead Maternity Carer (LMC).
- ALCOHOL HELPLINE (0800-787-797): Help and advice for concerns about problem drinking.
- CITIZENS' ADVICE BUREAU (07-839-0395): Able to provide information on most local organizations. Check with this group to find out about new community support services.
- CRISIS ASSESSMENT AND TREATMENT (CAT) TEAM (0800-50-50-50): Available 24-hours, 7 days per week for mental health emergencies.
- HAMILTON WOMEN'S REFUGE (07) 855 1569 (24hrs): Help for women dealing with domestic violence.
- HEALTHLINE (0800-611-116): A 24-hour telephone health service.
- LIFELINE (0800) LIFELINE or (0800 543 354): 24-hour telephone counseling service
- NEST, SALVATION ARMY (07-843-4509; corner of Kahikatea Drive and Ohaupo Road, Hamilton): Community and family services, early childhood education, crèche, social services.
- PARENT-LINE (07-839-4536): Support for parents under stress. Parenting groups, anger management, domestic survival groups, Keeping Ourselves Safe programme, one-to-one counselling, and family therapy are some of the services offered.
- PLUNKET LINE (0800-933-922): Offers a 24-hour service with advice on child health and development.
- RELATIONSHIP SERVICES WHAKAWHANAUINGATANGA (07-839-3267; or 0800 RELATE): Relationship skills, counselling, effective parenting, effective communication.
- WAIKATO FAMILY CENTRE (07-834-2036; Radnor Street, Hamilton): Professional advice for mothers. Free advice and options given to mothers of unsettled babies as well as advice with breastfeeding, crying, colic, sleeping, reflux, bottle feeding, post-natal distress, and parenting skills. Phone first to discuss the problem. Cots and beds provided for hands-on assistance with infants.

Internet Resources:

- www.webhealth.co.nz: provides information on services available, searchable by specific problem and region
- www.everybody.co.nz: Information on a variety of health and mental health problems and services in New Zealand
- www.parentscentre.org.nz: information on Parents Centres, which provide support and information for parents throughout New Zealand

Appendix E

Reminder letter.

Dear Participant,

A group of researchers from the University of Waikato, staff at Fertility Associates, Waikato Hospital, and local midwives are working on a project to help us understand how stress affects women during pregnancy. This part of the project is aiming to understand how stress affects women and their partners who have undergone IVF treatment.

The questionnaire asks about your pregnancy, health care, and thoughts and feelings about relationships, stress, anxiety and mood. The questionnaires take less than 20 minutes to complete and you are free to decide not to participate, or to not answer questions, or to stop at any time.

I am asking Sue to send this letter out as a prompt to some of you who received the questionnaire, thought about filling it out, and got caught up in the Christmas rush!

As many of you are aware, this information helps the research group to understand and care for the needs of people treated with IVF, and is also a valuable part of my Master's thesis, and I am very grateful to those of you who have replied already.

If you have misplaced the forms and would like another copy posted out, please contact Sue (07 839 2603), or access the website at http://psychology.waikato.ac.nz/surveys/ivf/index.htm to complete it online.

Remember your participation is entirely confidential and will not affect your care at Fertility Associates now or in the future.

Sending you all my very best wishes for the New Year,

Regards,

Elizabeth.

Appendix F

Community Mothers' information sheet & partners' information sheet.

Department of Psychology

The University of Waikato

Private Bag 3105

Hamilton, New Zealand

Telephone 64-7-856 2889

Facsimile 64-7-858 5132

Stress and Pregnancy Project

Information Sheet

A group of researchers from the University of Waikato is working with staff at Waikato Hospital and local midwives on a project to help us to understand how stress affects women during pregnancy, and how women cope with medical problems during pregnancy. We would like to ask you to take part in this project, which involves filling in some questionnaires (or answering questions in person, if you prefer), and allowing us to get some basic health information from your doctor and/or midwife and your medical record. You are always free to decide not to participate, or not to answer any particular questions, or to stop at any time. We are asking women with and without complications of pregnancy to participate, so that we can understand both groups.

If you decide to participate, we will give you a packet of questionnaires to complete. They ask questions about your pregnancy, health care, health behaviors, and thoughts and feelings about relationships, stress, anxiety, coping style, and mood. The questionnaires take about 30 minutes. You should complete them yourself, giving your own opinion about things. If you would rather answer these questions in an interview, we will arrange to have someone come and talk with you and ask the questions, and she will fill in the forms. In that case, it may take about an hour. Your

midwife or doctor will also fill in a short form about the type and severity of any pregnancy complications you have, your overall health, and your use of prenatal care and level of stress.

These forms won't become part of your medical record, and we will keep the information you give to us private. The exception to this might be if we were worried about your safety, such as if you tell us you are having suicidal thoughts; in that case, we would talk with you about what resources are available to help you, and would let your midwife/doctor know about the concern. However, since the data in questionnaires is made anonymous, we may not always pick up this kind of distress before your name is separated from the data, so we are providing information on support services for a variety of concerns to everyone. You will find this sheet in your packet.

In the project, you are given an ID number, so your name will not be on the forms you fill out or the computer files. No material which could personally identify you will be used in any reports on this study. We will ask for your name on the consent form, and, if you are willing, on a contact form so that we can contact you and ask you to participate in follow-up studies in the future. As a small thank you, we are also offering an entry to a draw for a $60 gift voucher; if you fill this entry form in, it will be kept separate from your questionnaires.

We would also like to ask your partner, if you have one, to participate. There is a similar set of forms for your partner to fill in. We would very much appreciate it if you would give a packet of information about the study to your partner. You and your partner are always free to decide not to participate, either now, or at any time during the study. Whether or not you participate won't have any effect on your prenatal or other medical care, and you and your partner may decide whether or not to participate independently.

This study has been reviewed and approved by the Northern Y Ethics Committee, and the University of Waikato Department of Psychology Ethics Committee. If you have any questions or concerns about your rights as a participant in this research study you can contact an independent health and disability advocate. This is a free service provided under the Health and Disability Commissioner Act, and can be accessed by calling 0800 555 050.

We really appreciate your time and thoughts if you decide to help with the study—we hope that it will help us to understand and care for the needs of pregnant women and their families.

If you have any questions about the study at any time, please feel free to call the lead researcher, Carrie Cornsweet Barber, at 07 838 4466 ext 6685, or e-mail ccbarber@waikato.ac.nz

Appendix G

Table 8:

Data screening and reliability statistics for scales.

	Pregnant Women (n=76)	Partners (n=48)
PSS	α =.84	α = .79
STAI		
State	α =.84	α =.95
Trait	α =.89	α =.92
EDPS	α =.87	α=.89
IBM		
Care	α =.91	α =.93
Control	α =.74	α=.90
CSES		
Coping	α =.92	α =.91
Stop	α =.86	α =.88
Support	α =.77	α =.84
QOL	α =.91	α =.88

PSS: Perceived Stress Scale

STAI: State and Trait Anxiety Inventory

EDPS: Edinburgh postnatal depression scale.

IBM: Intimate bond measure.

CSES: Coping self-efficacy scale.

QOL: Quality of life scale.

Appendix H

Correlation results of mothers and partners.

measure	Pearson Correlation	Significance (2-tailed)
PSS	0.32	0.03*
STAI –State	0.13	0.41
Trait	0.13	0.40
EDPS	0.24	0.11
IBM –Care	0.17	0.28
Control	0.21	0.17
CSES –Coping	0.14	0.38
Stop	0.18	0.24
Support	0.07	0.67
QOL	0.40	0.01*

* $P < .05$