ANXIETY AND DEPRESSION IN PREGNANT MOTHERS AND PARTNERS IN NEW ZEALAND

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ABSTRACT

Anxiety and depression throughout the antenatal period are associated with a multitude of adverse consequences. To date, little research has been conducted with both mothers and partners during the antenatal period particularly within a New Zealand context. The aims of this study were to identify rates of elevated anxiety and depression among antenatal mothers and partners, gain a clearer understanding of the relationship between anxiety and depression within couples and to examine risk factors for antenatal anxiety and depression. 57 couples, half recruited from the community and half from an antenatal inpatient unit, completed the PSAS, STAI, and EPDS. Results indicated that mothers and partners had almost identical rates of state (29.1% and 27.8% respectively) and trait anxiety (20.0% and 20.4%) and co-morbid anxiety and depression (10.5% for each gender). Furthermore, mothers experienced on average significantly higher trait anxiety and depression than partners. All measures were significantly correlated as were couples' anxiety and depression. Although not significant on their own, risk factors for mothers' anxiety and depression included pregnancy complications, low income level, belonging to an ethnic minority and young age. Partners' risk factors for anxiety included belonging to an ethnic minority, low level of education and earlier stages of gestation. Only ethnicity was a significant risk factor for state anxiety after controlling for the others. Implications of this research are discussed.

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CHAPTER ONE

Introduction

Pregnancy can be a time of glowing physical and mental health, with expectant mothers experiencing feelings of happiness and hope. However, pregnancy can also be a stressful time, marked by an increase in anxiety and feelings of depression. For many, anxiety may naturally increase at this time, with parents reporting feelings of apprehension and uncertainty (Delmore-Ko, Pancer, Hunsberger, & Pratt, 2000) and fear of the act of labour (Areskog, Uddenberg, & Kjessler, 1983). While a slight increase in maternal antenatal (also known as prenatal) anxiety and stress has been suggested as being beneficial for child development (DiPietro, Novak, Costigan, Atella, & Reusing, 2006), it is generally accepted that high levels of anxious and/or depressive symptoms in mothers has a detrimental effect across a multitude of areas.

Elevated anxiety and depression levels throughout the antenatal period have been linked to an increased risk of preterm births (Dole, 2001), difficult labour and delivery (Da Costa, 2000), and babies born with a low birth weight (Rahman, Bunn, Lovel, & Creed, 2007; Wadhwa, Sandman, Porto, Dunkel-Schetter & Garite, 1993). Moreover, both maternal and paternal antenatal depression have been shown to be associated with increased risk of behaviour (Brennan, Hammen, Katz, & Le Brocque, 2002) and emotional disorders in the child later in life (Ramchandani, O'Connor, Evans, Heron, Murray, & Stein, 2008). Furthermore, anxiety and depressive symptoms during pregnancy may be predictive of postnatal depression and anxiety (Grant, McMahon, & Austin, 2008; Gotlib, Whiffen, Mount, Milne, & Cordy, 1989; Evans, Heron, Francomb, Oke, & Golding, 2001) and may have negative ramifications not only for the child, but for

the marital relationship as well (Brandon, Trivedi, Hynan, Miltenberger, Labat, Rifkin, & Stringer, 2008; Whisman, Ubelacker, & Weinstock, 2004).

Anxiety, and especially depression, during the *post*natal period have been studied extensively; however, relative to the postnatal period, the research on these topics during the *ante*natal period is sparse. There is even less research regarding partners' experiences during this time. Furthermore, there also seems to be a paucity of research within this specific field in a New Zealand context. Thus, it remains unclear as to the extent of the issues as well as the risk factors associated with increased antenatal mental health problems for New Zealand parents. Given these apparent issues, it is unsurprising that there is need for further investigation in this area.

The purpose of this study is to identify rates of depression and elevated anxiety among antenatal mothers and partners, examine risk factors, and to gain a clearer understanding of the relationship between anxiety and depression in antenatal couples. Chapter One of this thesis is divided into five subsections. The first subsection defines anxiety and depression and is followed by a discussion of the negative implications of antenatal anxiety and depression upon concerned parties. The second subsection examines the rates and co-morbidity of anxiety and depression in women and men, both outside of, and during the antenatal period. The third subsection then discusses gender differences in anxiety and depression followed by explanations as to why these gender differences occur. The fourth subsection will then examine the literature on the relationship between couples' levels of anxiety and depression. The fifth subsection then examines the literatures to identify risk factors for anxiety and depression, both outside of and during the

antenatal period. This chapter concludes with the introduction of the research aims for the current study.

Anxiety and depression

Anxiety can generally be considered as a vague, unpleasant mood state (Reber & Reber, 2001). More specifically, the symptoms of anxiety typically include subjective feelings of tension, apprehension and fear combined with physiological symptoms such as heart palpitations (Weiten, 2004). Sapolsky (2004) likens anxiety to anticipatory stress-response, which prepares the body in anticipation of a perceived stressful event (stressor). This stress-response induces physiological reactions, such as increased heart rate, and increased 'stress' hormones of cortisol, adrenaline and noradrenaline (Carlson, 2002). These symptoms may be adaptive in that they help us to notice, prepare, and plan for future threats (Kring, Davison, Neale, & Johnson, 2007); however, excessive amounts of anxiety can be detrimental to one's wellbeing. High levels of anxiety have been shown to decrease cognitive performance (Yerkes & Dodson, 1908), may alter one's perceptions of time and space, and can also impair learning (Sadock & Sadock, 2007).

Depending on the severity, frequency and distress/impairment related to the anxiety, an anxiety disorder diagnosis may be appropriate. One particular anxiety disorder is Generalized Anxiety Disorder (GAD). GAD is chronic in nature (Carr & McNulty, 2006), is characterised by excessive anxiety and worry over a variety of events or activities (American Psychiatric Association, (A.P.A) 2000) and may cause the individual significant impairment and/or distress during their daily life (Kring et al., 2007). Given the pervasive nature of GAD, it is not surprising that it has been seen as akin to 'trait' anxiety (Carr & McNulty, 2006;

Austin, Tully, & Parker, 2006), which was conceptualised by Spielberger, Gorsuch and Lushene (1970). Trait anxiety will be discussed in further detail in Chapter Two.

Further to the more generalized, temporary and pervasive types of anxiety, as previously alluded to, anxiety and stress directly related to pregnancy itself may be experienced by mothers and partners. Although somewhat dated, in their examination into anxiety provoking stressful events related to pregnancy, Arizmendi and Affonso (1987) found that parents' most common and intense stressors were concerns regarding their baby's welfare and anxiety over the labour and delivery.

In addition to pregnancy specific anxiety, expectant parents may also be susceptible to depression. Depression can be defined generally as a mood state which may include symptoms of despondency, pessimism and sadness (Reber & Reber, 2001). When an excessive or inappropriate level of these symptoms occurs to the degree that the individual is clinically impaired a diagnosis of Major Depressive Disorder (MDD) may be warranted. MDD (commonly referred to as depression) is characterised by persistent feelings of sadness and despair and a loss of interest in previous sources of pleasure (Weiten, 2004). Other symptoms of MDD include fatigue, reduced ability to concentrate, weight changes, irritability and obsessive rumination (A.P.A, 2000). Although somewhat debated, the symptoms of depression during pregnancy are widely regarded as being similar both during and outside of the antenatal period (Leigh & Milgrom, 2008).

Levels of maternal stress, anxiety and depression throughout pregnancy are particularly important for numerous reasons. As previously mentioned, a slight increase in maternal antenatal anxiety has been argued to be beneficial for child development (DiPietro et al., 2006), yet, research has identified a plethora of

negative consequences which arise from elevated levels of both anxiety and depression (often referred to in the literature as ‘distress’).

Much research on maternal antenatal distress has come from animal studies, from which, convincing evidence exists that a multitude of cognitive and affective difficulties for offspring, result from maternal prenatal distress. Huizink, Mulder and Buitelaar (2004) comprehensively reviewed evidence from animal studies into the effects of prenatal exposure to stress. The authors concluded that the in-utero physiological alterations in important areas of the offspring’s brain, such as the hypothalamic-pituitary-adrenal axis (HPA), are indeed likely to lead to increased susceptibility to all forms of psychopathology (including cognitive and emotional).

The research on human subjects is equally compelling. Further to the negative consequences outlined in the Introduction Section, early research by Beck, Siegal, Davidson, Kormeier, Breitenstein and Hall (1980) found that high state anxiety predicted labour length. Moreover, antenatal depression has been linked to obstetric complications and poorer neonatal outcomes. Chung, Lau, Yip, Chiu and Lee (2001) found that depression late in pregnancy was associated with increased risk of caesarean sections and instrumental vaginal deliveries.

Prenatal anxiety and stress has also been linked to adverse baby/child health. In their recent prospective study, Beijers, Jansen, Riksen-Walraven and de Weerth (2010) found that prenatal anxiety and stress was associated with an increase in infant illnesses and increased antibiotic use. Furthermore, the timing of maternal stress, anxiety and depression throughout the antenatal period has been suggested to impact very differently upon neonatal development. Davis and Sandman (2010) examined maternal stress, anxiety and depression. The authors studied not only the more general ‘state’ anxiety, but pregnancy specific anxiety

in conjunction with cortisol levels. The authors found that pregnancy specific anxiety earlier in the gestation period led to slower child development over the first year of life. Conversely, elevated pregnancy specific anxiety during the later stages of gestation was associated with accelerated child development.

In addition to the adverse effects on the child, elevated maternal anxiety may predict poor psychological functioning for the mother postnatally. In their Australian study on the course of maternal anxiety, Grant et al., (2008) found that high antenatal anxiety, considered as over 40 on the State Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), to be a significant predictor of postnatal anxiety and mood disorders. This is consistent with other research (Beck et al., 1980) where high trait anxiety predicted post-natal depression in mothers. Moreover, maternal anxiety and depression have been found to negatively affect partners' mental health (Areias, Kumar, Barros, & Figueiredo, 1996) as well. Elaboration on this point will follow later in this Chapter.

Whilst maternal antenatal stress, anxiety and depression have received closer attention, *paternal* antenatal mental health has attracted less research interest. Although research in this area is lacking, studies have suggested that partners' stress, anxiety and depression may lead to negative consequences particularly for the child in later life. Ramchandani, and colleagues (2008) found that children were at greatest risk for psychopathology if fathers were diagnosed as depressed during both the prenatal and postnatal periods. Furthermore, Ramchandani et al., (2008) found that postnatal depression in fathers was associated with psychological disorders, specifically, Oppositional/Defiant and Conduct disorders, when the child was approximately age seven.

The above studies have highlighted a plethora of detrimental effects, upon not only foetal and child development but parental mental health, as a consequence of both maternal and paternal elevated antenatal anxiety and depression. Thus, a strong case is made for the necessity of further research in order to gain a clearer understanding of the extent to which antenatal anxiety and depression affect expectant parents in New Zealand. With this knowledge, the appropriate support strategies and services may be implemented at an appropriate level.

Prevalence of anxiety and depression

Anxiety and depressive disorders are fairly common among women and men across the lifespan and are often co-morbid (i.e. they occur together). In their sample of middle aged twins, Wetherell, Gatz and Pedersen (2001) reported a high correlation of r=.84 between anxiety and depression. In New Zealand, of those diagnosed with any mood disorder, 49.6% also experienced an anxiety disorder (Oakley-Brown, Wells, & Scott, 2006). Furthermore, this comorbidity is evident during pregnancy. In their Portuguese study, Teixeira, Figueiredo, Conde, Pacheco and Costa (2009) found a high association between depression and anxiety, as measured with the STAI-state and Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden, & Sagovsky, 1987) in both the mother and partner participants in their sample. Furthermore, the authors found that comorbidity of anxiety and depression was higher during the first trimester of pregnancy and lower during the third trimester. 10.6% of women and 11.1% of partners were co-morbid during the first trimester, and 5.9% and 2.9% of women and men respectively were reported as being co-morbid during the third trimester of pregnancy.

In New Zealand, Te Rau Hinengaro - The New Zealand Mental Health Survey (Oakley-Brown et al., 2006) found that approximately one in four (i.e. 25%) New Zealanders will experience an anxiety disorder over the course of their lifetime. Specifically, GAD is reported to have a lifetime prevalence of 7.5% in women and 4.4% in men (Oakley-Brown et al., 2006).

Lifetime prevalence rates of MDD have been reported from 5-25% (A.P.A, 2000). Similar figures have been reported from Te Rau Hinengaro - the New Zealand Mental Health Survey (Oakley-Brown et al., 2006). They found that one in five people will experience a depressive disorder over the course of their lifetime. Specifically, they reported the lifetime prevalence of MDD at 16%, however, for men it is 11.4% and for women 20.3%.

The rates of anxiety and depressive disorders are clearly demonstrated in the prevalence literature discussed. Yet it seems that further research is needed to clearly delineate the epidemiology of anxiety and depression in women, and partners, during pregnancy (Halbreich, 2005). Rates of reported perinatal (which includes the antenatal and postnatal period) anxiety and depression vary widely and this may be due to a number of factors such as different methodology used to assess depression (e.g., self-report questionnaires or structured clinical interviews), differences in socio-economic variables across samples (Halbreich & Karkun, 2006) and differing cut-off scores on self-report questionnaires.

The transition through pregnancy and childbirth has been linked to an increase in anxiety (Condon, Boyce, & Corkindale, 2004). Rates of anxiety disorders seem to range between 15% and 21%. In their prospective study examining the course of maternal anxiety throughout pregnancy, Grant et al., (2008) reported that 21% of their participants (N=100) met the criteria for an anxiety disorder. Lower rates of diagnosable anxiety disorders were found in

Uguz, Gezginc, Kayhan, Sari and Buyukoz's (2010) study, with the authors reporting a current rate of 15.5%. With regard to elevated anxious symptoms (as opposed to diagnosed disorders) the rates tend to be higher due to the use of self-report instruments to measure symptoms (Wee, Skouteris, Pier, Richardson, & Milgrom, 2010). Rates have been found to range between15% to 30%. Teixeira and colleagues (2009) administered the STAI-state form in each trimester of pregnancy. Using a cut-off of 45, the authors found that an average of 15.17% of their sample of pregnant women was classified as highly anxious. However, much higher rates of elevated anxiety have been reported. In their Australian study, Grant and colleagues (2008) found that 33% of their sample of pregnant women were elevated in both state and trait anxiety. Higher still, Faisal-Cury and Menezes (2007) administered the STAI state and trait forms to 432 pregnant women attending a private clinic in urban Brazil. They found that 59.5% were elevated for state anxiety and 45.3% for trait anxiety.

Within the antenatal period, the literature on rates of partners' anxiety, like antenatal depression, is sparse. One of the only studies uncovered by the author which a) specifically examined prevalence in paternal antenatal anxiety, and b) utilised a self-report measure, in this case the STAI, was that by Teixeira et al., (2009). The authors found that 8.76% of fathers in their sample were elevated in state anxiety and classified as highly anxious.

Although discrepancies exist, it appears that rates and levels of elevated anxious and depressive symptoms in the antenatal period are fairly similar. In a review of depressive symptoms in pregnant women, Halbreich (2004) found that the rate of mood disorder diagnoses fell consistently within the range of 6% to 16%. Similar rates of depressive disorder diagnoses have been reported in other literature, for example, 8.1% (Uguz et al., 2010), 10% (Gotlib et al., 1989) and 10-

15% (Weissman & Olfson, 1995).With regards to elevated depressive levels it appears they range from 12% to 30%. Teixeira et al., (2009) conducted a prospective study on depression and anxiety in 300 women and their partners whom were recruited from an obstetrics outpatient clinic during their first appointment. The authors administered the EPDS in each trimester of pregnancy and found that over the three trimesters, on average 20.37% of women were elevated in depressive symptoms (using a cut-off of 10). Other studies have found relatively similar rates. Also using the EPDS, in their cross sectional investigation into prevalence of anxiety and depression in Brazilian pregnant women (N=432), Faisal-Cury and Menezes (2007) found that 19.6% of their sample had depression. However, a lower rate was found in Matthey, Barnett, Ungerer and Water's (2000) study. The authors compared the depression levels of mothers and partners (N=157) throughout pregnancy and reported that 12.3% of their sample of pregnant mothers were elevated in depressive symptoms (using the EPDS cut-off of >12). At the other end of the spectrum, the relatively high rate of 30.2% was reported in Harrington and Greene-Harrington's (2007) investigation into depression among urban pregnant women (N=119).

Outside of pregnancy, rates of diagnosable depression for men have been found to be around 16% (Oakley-Brown et al., 2006). During the antenatal period, the literature is meagre in comparison to mothers'; however, from the available studies, an indication of depressive levels is gained. Rates seem to range between 5% and 12%. Teixeira et al., (2009), utilizing the EPDS and a cut-off score of 10, found that 7.96% of partners were elevated in depressive symptoms. Again using the EPDS, Matthey et al., (2000), reported that 5.3% of fathers were above the cut-off of 12 and therefore likely to be depressed. A further study by Buist, Morse

and Durkin (2003) found that 12% of their sample of men (N=294) were experiencing depression (defined as 11 and over on the EPDS).

It is evident that rates of anxiety and depression are relatively well researched outside of the antenatal period and that the literature on paternal mental health during the antenatal period is blatantly lacking. A baseline of estimated rates of mothers' and importantly, partners' anxiety and depression would therefore be desirable, especially within a New Zealand context. This would help clarify the extent to which parents may be experiencing high levels of anxiety and depression and enable researchers to then make comparisons between mothers' and partners' anxiety and depression.

Gender differences in anxiety and depression

Overall, women report higher rates of anxiety and depressive disorders than men. The international literature indicates that women are more likely than men to have anxiety disorders, including generalised anxiety disorder (Kessler, McGonagle, Zhao, Nelson, Hughes, Eshelman, Wittchen, & Kendler, 1994).Women are also more likely to experience depression throughout their lifetime compared to men (Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993) with female/male ratios at approximately 2:1 (Kessler, 2003). Correspondingly, in New Zealand/Aotearoa, lifetime prevalence rates indicate women are almost twice as likely as men to experience depression and women have higher prevalence rates of any anxiety disorder compared to men (Oakley-Brown et al., 2006).

Within the limited studies, it appears that the gender difference remains during pregnancy for depression; however, it is unclear with regard to anxiety. In Teixeira and colleagues' (2009) study, women reported significantly higher state anxious and depressive symptoms than their partners. In support, Matthey et al.,

(2000) found that mothers reported significantly higher levels of depression than partners. A further study by Field, Diego, Hernandez-Reif, Figueiredo, Deeds, Contogeorgos and Ascencio (2006) was conducted in Portugal. The authors administered a self-report depression scale and the STAI-state to pregnant mothers and their partners and found that women reported higher (although not statistically significant) levels of depression than partners. However, partners had significantly higher ($p < .05$) levels of state anxiety. Specifically, partners scored on average 36.3 and mothers scored 28.5.

The differences in the higher reported rates and levels of anxiety and depression in women than men may be due to numerous reasons. With regard to anxiety, the literature often conceptualizes anxiety and fear together. In their study on fear reporting, Pierce and Kirkpatrick (1992) found that men are more likely to under-report their experience of fear; however, women still reported greater levels of fear than the male participants. Similar results were found by Egloff and Schmukle (2004) in their comparison of implicit and explicit anxiety ratings between women and men. Women reported higher levels of (explicit) trait anxiety than men; however, the correlation between implicit and explicit anxiety measures was higher for women than men, which suggests that men may tend to under-report their actual level of anxiety. These studies highlight that, although there is evidence to suggest that men may under-report their anxiety, women consistently report higher levels of anxiety, in particular, trait anxiety. Consequently, a reporting bias may not fully account for the discrepancy between genders.

In their recent review, McLean and Anderson (2009) examined evidence of gender differences in anxiety and fear across different levels of analysis, including: molecular/biological, hormonal, physiological reactivity, negative affectivity, trait anxiety, self-efficacy, socio-cultural influences, and gender-role

influences. The authors found that gender differences in fear and anxiety were greatest when examining molar levels (i.e. sociocultural and gender-role influences) versus biological levels of analysis. Their study concludes that women may be more likely to develop anxiety disorders via vulnerability factors, such as higher trait anxiety and negative affectivity, which are moderated by socialization processes that "prescribe gender-specific expectations regarding the expression of anxiety and the acceptable means of coping with anxiety" (p.28).

As with anxiety, the difference between female and male reported rates of depression has been suggested to be due to various reasons. Based partly on the observation that gender differences in prevalence occurs around puberty, one hypothesis is that the discrepancy may be due to sex hormone differences (Sadock & Sadock, 2007). However, in their systematic review, Yonkers, Bradshaw and Halbreich (2000) concluded that differences in prevalence of major depression were not associated with hormonal factors. In a similar vein, Kessler (2003) concluded that pregnancy (and the associated hormonal changes that occur during this time) is not significantly related to the higher levels of anxiety and depression among women compared to men.

Researchers have proposed that women may be more vulnerable to depression than men. In his report on the epidemiology of depression and women, Kessler (2003) suggests that the higher rate of depression among women than men may be understood within the wider context of biological and genetic vulnerabilities in conjunction with stressful life experiences.

Furthermore, studies have suggested that men's manifestation of depression may be different than that which is typically assessed using current DSM-IV (A.P.A., 2000) criteria. Although co-morbidity of antisocial traits was not assessed, Moller-Leimkuhler, Bottlender, Straub and Rutz (2004) found that

irritability, aggressiveness and anti-social behaviour were more strongly inter-correlated with men's depression than with that of women. Additionally, Cochran and Rabinowitz (2000) argued that men's aggression, anger and alcohol use to self-medicate may obscure measured rates of depression. Similar findings were apparent in Chuick, Greenfeld, Greenberg, Shepard, Cochran and Haley's (2009) qualitative investigation into male depression. The authors found that heightened irritability, alcohol and substance abuse, and interpersonal conflict were associated with their participants' experience of depression. Furthermore, they concluded that "irritability, anger problems, and overworking tended to be the preferred strategies for managing a depressed mood" (p.310). Alcohol abuse, which most of the participants admitted as being concurrent with their depression, was viewed as a short-term solution in depression management. This indicates that rather than seek help from external sources, men may prefer to self-manage their depressive symptoms.

Finally, an under-reporting bias may also occur for symptoms of depression in men, akin to that of anxiety. This has been hypothesized to be due to poorer recall of symptoms (Wilhelm & Parker, 1994) and due to differences in the expression of depression as stated above.

Relationship between couples for anxiety and depression

Studies outside of the antenatal period have suggested that couples are concordant (have the same trait present in both partners) for mental health issues. Although some disagreement exists as to the concordance of anxiety (see Low, Cui, & Merikangas, 2007) the general consensus is that a relationship between couples' anxiety and depression exists. Meyler, Stimpson and Peek (2007) conducted a systematic review (of 57 articles) on couples' concordance on mental

health issues, in particular, depression and distress. The authors concluded that there is strong evidence to suggest that couple concordance for depression and distress exists. Further studies concur with this view. In their longitudinal study of elderly couples, Tower and Kasl (1996) found that changes in depressive symptoms in one partner contributed to changes in depressive symptoms in the other (both increased and decreased symptoms). Furthermore, research suggests that the crossover of depression between couples goes not only from husband to wife, but from wife to husband (Westman & Vinokur, 1998; Dubuis-Stadelmann, Fenton, Ferrero, & Preisig, 2001).

During the perinatal period there is evidence to suggest that the poor mental health of one partner negatively affects the other partner's mental health. Ballard, Davis, Cullen, Mohan and Dean (1994) found that fathers were significantly more likely to have post-natal depression if their partners did also. Similar results were found by Roberts, Bushnell, Collings and Purdie (2006) in their New Zealand study. Using a cross-sectional survey, the authors compared the mental health of men with partners who had elevated depressive symptoms with that of men with partners without elevated levels of depressive symptoms. They found that fathers were more likely to have elevated depressive symptoms if their partner had post-natal depression. Field and colleagues (2006) found that fathers whose partner was depressed experienced significantly higher depression and anxiety. Moreover, similar effects were found between mothers whose partner was depressed.

The literature is lacking on couples' association for anxiety and depression, particularly during the antenatal period. However, there is evidence to suggest that there is a relationship between mothers' and partners' depression

levels. Areias et al, (1996) found an association between depression in pregnant women with a higher incidence of depression in their partners.

While an association has been found between couples' anxiety and depression, both outside of and during the antenatal period, to gain a clearer understanding of the *degree* of association correlation studies are helpful. Most research on this subject has been conducted outside of pregnancy. Reporting a correlation statistic (usually Pearson's *r*), studies have revealed small to medium associations between 0.1 and 0.3. With a few exceptions, associations between couples' depression levels have been consistently found to be higher than that of anxiety. Dubuis-Stadelmann, et al., (2001) found a significant correlation (Kendall's Tau-b) between spouses for depressive symptoms ($\tau a = 0.11$) and for state anxious symptoms ($\tau a = 0.12$), however they found no association between couples' for neurotic traits. Similar results were found by Jones and Fletcher (1993) who reported correlations of $r=0.10$ and $r=0.18$ for anxiety and depression respectively, and Whisman et al., (2004) $r=0.12$ (anxiety) and $r=0.14$ (depression). Butterworth and Rodgers (2006) found an even greater relationship in their large representative sample (N=3808). The authors reported a correlation between couples for both depressive and anxious symptoms, of $r=0.25$. During the antenatal period, Matthey et al., (2000) found a small but significant correlation between mothers' and partners' depression of $r= 0.18$.

Several theories have been proposed which relevant to help explain couples' similarity with regard to anxious and depressive levels. Emotional Contagion (Hatfield, Cacciopo, & Rapson, 1994) can be defined as the "ability to mimic... and, consequently to converge emotionally" (p.5). In essence this theory explains couples' similarity of emotional states and tendencies as a process where one partner may naturally develop the other partner's mood and anxious state/trait

via (in part) empathetic crossover. Based originally within the evolutionary biological school of thought, another theory, Positive Assortative Mating, posits that couples are more likely to marry and mate with a partner who shares similar demographics, traits, attitudes and beliefs as themselves (Godoy, Eisenberg, Reyes-Garcia, Huaca, Leonard, McDade, & Tanner, 2000). Finally, Common Stressors have been implicated in the development of distress and depression between couples (Whisman et al., 2004). In their examination of 345 couples, Westman and Vinokur (1998) found that the correlation in depressive symptoms between partners was principally due to common stressors. The authors found that the common stressors interacted with increased negative social interaction, which in turn, increased partners' levels of depression.

Risk factors for anxiety and depression

Risk factors may be conceptualized as variables, or characteristics that may make it more likely that an individual will develop a disorder (Kowalenko, Barnett, Fowler, & Matthey, 2000). They may also broadly be divided into two categories; predisposing, which are factors (usually distal) that may increase susceptibility or vulnerability towards the development of a disorder, and, precipitating, which are those factors which typically precede and/or trigger a psychological disorder.

The literature suggests that there are a number of predisposing risk factors for anxiety in both women and men. Predisposing risk factors for anxiety disorders and increased levels of anxiety have been found to include a range of genetic, biological and psycho-social factors. Twin studies have largely confirmed that there is an association between genetic vulnerability and the development of anxiety disorders (Hettema, Neale, & Kendler, 2001). In addition,

physiological/neuro-biological components, such as elevated activity in the fear-circuit (particularly the amygdala) are considered important in the development of anxiety (Kring et al., 2007). Furthermore, neuroticism (defined as the tendency to respond to circumstances with disproportionately negative affect) (Kring et al, 2007) which arguably shares similar components with trait anxiety, has been associated with increased risk of anxiety disorders. Prospective research conducted in the Netherlands by de Graaf, Bijl, Ravelli, Smit and Vollenbergh (2002) found that neuroticism predicted the onset of anxiety disorders in their large sample of over 7,000.

Precipitating factors may also be viewed as stressful events. Broadly speaking, stressful life events may both predispose *and* precipitate the onset /occurrence of anxiety. The contemporary review by Nugent, Tyrka, Carpenter and Price (2011) supports the link between early stressful life events and the development of anxiety disorders. Further to this, in their retrospective study, Hicks, DiRago, Iacono and McGue (2009) concluded that life stressors, such as family, financial and legal problems may lead to increased risk of anxiety disorders.

The crossover between risk factors associated with anxiety and depression is apparent. Similar to the genetic risk factors for anxiety, predisposing factors for the development of depression have been reported to include genetic vulnerability and childhood adversity/early life stressors (including loss of a parent in childhood and any form of abuse) (Carr & McNulty, 2006). Further demonstrating not only the similarity between risk factors for anxiety and depression, but the co-morbidity between the two, anxious personality type (trait anxiety) has been proposed as a risk factor for the development of a depressive disorder (Parker & Brotchie, 2010). Within New Zealand research, Oakley-Brown et al., (2006)

highlight Māori and Pacific ethnicity, female gender and young age as risk factors for the development of both anxiety and mood disorders.

Precipitating risk factors in the development of depressive disorders are, again, akin to the family, financial and legal stressors which precipitate anxiety. These have been found to include unemployment (Carr & McNulty, 2006), and marital discord (Whisman & Kaiser, 2008).

During the antenatal period, the literature on risk factors for the development of anxiety and depression is sparse in comparison to the postnatal period and outside of the perinatal period. Nevertheless, several risk factors have been found to increase mothers' likelihood of experiencing elevated anxiety and/or an anxiety disorder. Analogous to risk factors outside of the perinatal period, Grant et al., (2008) found that non-Caucasian and single women were more likely to be diagnosed as anxious during pregnancy, and particularly, to report elevated scores on both the state and trait measures of the STAI. Similarly utilising the STAI, Faisal-Cury and Menezes (2007) found that, low level of education, and younger age were associated with higher state and trait anxiety, while low income and ethnic minority were associated with higher trait anxiety. In addition, studies have highlighted that mothers who experience current stressful life events are more likely to be anxious during pregnancy. One example of this was found in a Japanese study by Kataoka, Yaju, Eto and Horiuchi (2005). The authors found that women who experience domestic violence while pregnant were significantly more likely to develop elevated levels of anxiety. A further stressful event, pregnancy complications, has been identified as a risk factor for pregnancy specific anxiety (Da Costa, Larouche, Drista, & Brender, 1999).

There is evident crossover between risk factors for antenatal anxiety and depression. Risk factors for depression found in previous antenatal research

include low socio-economic status (Halbreich, 2004; Leigh & Milgrom, 2008), belonging to an ethnic minority (Halbreich, 2004) younger or older age; particularly 18 and under, or 35 and over, low level of education, and greater number of children (Ryan, Milis, & Misri, 2005). Those factors which are more specific to pregnancy include pregnancy complications and obstetric risk (Kowalenko et al, 2000; Brandon et al., 2008), and single motherhood (Ryan et al., 2005).

Although the literature on partner's risk factors for both elevated antenatal anxiety and depression is sparse, they are reported to be fairly similar to mothers' risk factors. Risk factors have been found to include low education and unemployment (Deater-Deckard, Pickering, Dunn, & Golding, 1998). Research has also indicated that the later stages of gestation may be a time of increased risk of anxiety for partners. Condon et al., (2004) found that the third trimester of pregnancy was the period where men would most likely experience a significant level of distress. However, the earlier stages of pregnancy may be when partners experience higher levels of depression. Buist et al., (2003) examined paternal depression levels throughout pregnancy (N=294). They found that fathers were more likely to report elevated depression levels earlier in the gestation period (12% of their sample) compared to the later stages (8.7%).

It is hypothesized that there are many causal pathways to the development of anxiety (Kring et al., 2007) and depression (Dobson & Dozois, 2008) not only outside of the antenatal period, but during as well (Ryan et al., 2005). Often referred to, the Biopsychosocial model (Engel, 1977) is helpful to understand the aetiology of psychopathology. The model posits that mental illness is born out of a combination of biological, psychological and social factors. Thus, it is likely that biological, genetic, psychological and environmental factors such as those

mentioned above, interact to increase an individual's likelihood of developing a depressive or anxious disorder.

It appears that there are many factors associated with increased risk of anxiety and depressive disorders during the antenatal period. Furthermore, there are similarities between the risk factors during and outside of the antenatal period and also between those for anxiety and depression. Although the literature is fairly abundant in the area of antenatal risk factors for anxiety and depression, no identified studies within a New Zealand context were found. This area is ripe for research.

Summary

As we can see from the literature above, it is evident that antenatal maternal and paternal anxiety and depression have many detrimental effects upon the wellbeing of all concerned. These negative consequences emphasize the need for research into antenatal anxiety and depression in expectant parents. In addition, it is apparent that several gaps in the literature exist. While it is clear that the co-morbidity of anxiety and depression and the commonality of their occurrence within the general population have been well documented, this is not the case regarding the antenatal period. Not only are rates of maternal anxiety and depression during pregnancy unclear, but research on rates of paternal anxiety and depression is sparse, at best. Nevertheless, from the available literature, it is clear that there are gender differences between reported rates of anxiety and depression, with women reporting higher rates of anxious and depressive disorders. Furthermore, initial studies into the antenatal period have alluded that this difference remains with regard to depression, yet is still uncertain regarding anxiety. Research suggests there is an association between couples' levels of

anxiety and depression. As most correlation studies have been conducted outside of the antenatal period, there is a lack of research examining this relationship during this time. This suggests a gap in the literature which further research would help to remedy. Finally, risk factors for elevated antenatal anxiety and depression, while relatively well researched internationally, have not, to the author's knowledge, been examined in both mothers and partners in New Zealand.

The goal of the current study is to examine the levels of and the relationships between antenatal anxiety and depression in mothers and partners, within a New Zealand context. In doing so, a better understanding of the extent to which antenatal anxiety and depression affect New Zealand parents may be gained. More specifically, the current study aims to:

1/ Determine the rates of elevated anxiety and depression within the current sample of pregnant women and their partners.

2/ Briefly examine the co-morbidity of and relationship between anxiety and depression in mothers and in partners.

3/ Examine the differences between mothers and partners' levels of anxiety and depression.

4/ Examine the relationship between mothers and partner's levels of anxiety and depression.

5/ Examine the risk factors for elevated anxiety and depression.

CHAPTER TWO

Methodology

The current study formed part of a larger cross-sectional, descriptive research project on stress and distress in pregnancy conducted by researchers from the University of Waikato, New Zealand. A subsample of participants and subset of the questionnaires used in the larger study were included in the current study.

Ethics approval

Ethics approval to conduct research with human participants was sought and obtained from the Ministry of Health's Northern Y Regional Ethics Committee and the University of Waikato Department of Psychology Ethical Review Committee. As a part of this process, consultation was undertaken with an advisor from Te Puna Oranga (Māori Mental Health Service within the Waikato District Health Board) to help ensure the study was concordant with the spirit and intent of Treaty of Waitangi.

Participants

The participants within the current study were a subgroup of an overall sample who participated in a larger descriptive research project. To fulfil the research aims of this project, the subgroup was selected as both mothers *and* partners filled in the questionnaires. The overall sample of participants will be described below, followed by the participants within the current study.

Within the overall sample, 223 mothers and 57 partners participated. Pregnant participants came from two groups; one group was hospitalized for

pregnancy complications and the second group was recruited from the community. Of the pregnant participants, 109 (48.9%) were recruited from the hospital and 114 (51.1%) from the community. Mothers' mean age was 28.9 years and partners' was 30.33 years. Most of the participants (133- 59.6%) identified as New Zealand European, followed by Other (52- 23.3%) and then Māori (38- 17%). Ethnicities identified in the category of Other included New Zealand European/ Māori, Indian, Chinese, Afghani, Samoan, Filipino, Other European, Tongan, Cook Island Māori and New Zealander.

57 mothers and 57 partners participated in this study. Of the pregnant participants, 29 (50.9%) were recruited from the hospital and 28 (49.1%) from the community. The mean age of mothers was 28.75 years and partners 30.33 years. Frequencies of participant's ethnicities are presented in Table 2.1. As can be seen, the majority of participants identified as New Zealand European followed by Māori. The remaining participants' ethnicities included NZ European/Māori, Other European, Afghani, Filipino, Chinese, Tongan, Cook Island Māori and New Zealander.

Table 2.0

Frequencies of participant's ethnicities

Ethnicity	Mothers		Partners	
	N	%	N	%
New Zealand European	33	57.9	37	66.1
Māori	13	22.8	6	10.7
NZ European/Māori	4	7	2	3.6
Other European	4	7	5	8.9
Afghani	1	1.8	1	1.8
Filipino	1	1.8	1	1.8
Chinese	1	1.8	1	1.8
Tongan	-	-	1	1.8
New Zealander	-	-	1	1.8
Cook Island Māori	-	-	1	1.8

Pregnant participants who were recruited from the hospital were screened for eligibility according to information on the intake case file and based on the judgment of medical staff. The criteria for hospitalized patients for exclusion from participation in the study were 1) admission for the sole purpose of labour induction, 2) foetal demise or severe malformation of the foetus, and 3) medical instability which, in the opinion of a physician or midwife, would contraindicate participation in the research.

The inclusion criterion for partners was that the woman considered the person a “partner”, irrespective of the length of the relationship, person’s gender or biological relationship to the foetus.

Along with the above criteria, all participants required sufficient comprehension of the English language to adequately understand and answer the questions in the questionnaire. Participants were also required to be at least 16 years of age in order to fulfil the ethical requirements for age of consent.

Materials

The materials used in the current study were the following:

- A questionnaire packet containing either mother or partner forms:
    - Information cover sheet for mothers (Appendix A) and partners (Appendix B)
    - Consent form for mothers (Appendix C) and partners (Appendix D)
    - Instructions for filling in forms for mothers (Appendix E) and partners (Appendix F)

    Instructions on how to create an I.D. (Appendix G)

    - Background information form for mothers (Appendix H) and partners (Appendix I)

- Battery of questionnaires including:

    1) Pregnancy Specific Anxiety Scale (PSAS) (Roesch, Dunkel-Schetter, Woo, & Hobel, 2004) for mothers (Appendix J) or partners (Appendix K)

    2) State Trait Anxiety Inventory (STAI) (Spielberger, et al, 1983) state form (Appendix L) and trait form (Appendix M)

    3) Edinburgh Postnatal Depression Scale (EPDS) (Cox, et al, 1987) (Appendix N)

- Draw for gift voucher sheet (Appendix O)

-Support resources sheet for families (Appendix P)

- Online website in which to complete questionnaires:

http://psychology.waikato.ac.nz/surveys/mothers/index.html

Questionnaire packets

The questionnaire packets were either female or male versions. They contained a total of 12 pages of questions, including three pages of background information (see Appendices H & I) and 12 psychometric assessment tools, three of which were used in the present study (see Appendix J, K , L & M). The questionnaires took approximately 25-30 minutes to complete when filled in by the participants, and approximately 60 minutes when completed in interview form with a research assistant.

Measures

For this study, the primary variables were anxiety and depression as reported by the pregnant women and their partners. Anxiety during pregnancy has been conceptualised and measured in a variety of ways, including as a

personality/dispositional quality (trait), as a function of general life events, and as a function of pregnancy specific fears (e.g., fears of labour or marital decline) (Lobel & Dunkel-Schetter, 1990). Although most research has tended to operationalize prenatal anxiety using the more generalised measures of anxiety (van Bussel, Spitz, & Demyttenaere, 2009), research has suggested that anxiety which is related to the pregnancy itself is an important variable to consider (Roesch, Dunkel-Schetter, Woo, & Hobel, 2004; Lobel, Canella, Graham, DeVincent, Schneider, & Meyer, 2008). To gain both general (short-term and long-term) and pregnancy specific measures of anxiety, the Pregnancy Specific Anxiety Scale (PSAS) (Roesch et al., 2004) and State Trait Anxiety Inventory (STAI) (Spielberger et al., 1983) were used to measure levels of anxiety in the current study. A number of studies have used the STAI-state to assess high anxiety (for example, Teixeira et al., 2009) while the STAI-trait has also been utilised (for example, Austin et al., 2006). In these previous studies, state anxiety was used to give an indication of current anxiety, where trait anxiety was utilized to estimate anxiety disorders, in particular GAD (Austin et al., 2006). Within the current study, to determine prevalence rates, the STAI-trait was used as in previous research as an estimation of anxiety disorders (GAD), and STAI- state was used in order to examine current elevated anxiety levels. Throughout Chapters Three and Four, trait anxiety and GAD will be used interchangeably.

There are a number of psychometric tools which measure depressive symptoms during the perinatal period. For the present study, the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al., 1987) was chosen as it has been used extensively for measuring depressive symptoms and screening for antenatal depression (Yonkers, Smith, Gotman, & Belanger, 2009; Cox & Holden, 2003; Boyd, Le, & Somberg, 2005; Gibson, McKenzie-McHarg, Shakespeare, Price, &

Gray, 2009) and is regarded as an effective measure in this instance (Ryan et al., 2005). The EPDS may be used at any stage of pregnancy to screen for depressive symptoms (Yonkers et al., 2009) and importantly, the EPDS has been validated for use with not only mothers, but partners/fathers as well (Matthey, Barnett, Kavanagh, & Howie, 2001).

Further descriptions of the measures used in the current research are given below.

Pregnancy Specific Anxiety Scale

The Pregnancy Specific Anxiety Scale (PSAS) (Roesch et al., 2004) was developed specifically to assess women's level of stress/anxiety about their pregnancy. The measure includes four items which ask the participants to rate how anxious, concerned, afraid and panicky they have "felt about being pregnant in the past week, including today". Partners were asked how they felt about their partner being pregnant in the past week. Participants may choose their response from a five point scale, with 1 being "never" and 5 "always". Scores on the four items are meaned and may range from a minimum score of one and maximum of five. Higher scores indicate greater anxiety regarding the pregnancy.

The PSAS has adequate reliability with Mancuso, Schetter, Rini, Roesch and Hobel (2004) reporting reliability coefficients (Cronbach's Alpha) of .72 and .65.

State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory (STAI) (Spielberger et al., 1983) was designed to measure two 'types' of anxiety- state and trait anxiety. According to Spielberger and colleagues (1983), state anxiety is characterised by "subjective

feelings of tension, apprehension, nervousness and worry, and by activation of the autonomic nervous system" (p.1). State anxiety may fluctuate over time and can vary in intensity. Thus, state anxiety can be conceptualised as a transitory and temporary reaction or experience. In comparison, trait anxiety is a relatively stable characteristic or quality that may refer to an individual's "anxiety-proneness", similar to a personality trait (Spielberger et al., 1983, p. 1).

The STAI is a 40 item (consisting of two twenty item scales) self-report questionnaire which requires the test taker to read the statements and respond by circling the answer (on a four point scale) which most closely resembles their response. The scores on each scale range from twenty up to a maximum of eighty, with higher scores indicating the presence of a high level of anxiety. On the STAI Form Y-1, measuring state anxiety, participants are asked how he or she feels *at this moment* i.e. at the exact time they are filling in the questionnaire. Statements on the STAI Form Y-1 include "I feel nervous", I feel at ease", and "I feel indecisive". The four responses from which participants may choose consist of "not at all", "somewhat", "moderately so", and "very much so". The STAI Form Y-2, measuring trait anxiety, asks participants to respond to the statements, indicating how he or she *generally* feels. Statements on the STAI Form Y-2 include "I have disturbing thoughts", "I am content", and "I take disappointments so keenly that I can't put them out of my head". The four responses from which the participants may choose are "almost never", "sometimes", "often", and "almost always". Both percentile ranks and standard (t) scores are available for working males and females in three age groups: 19-39, 40-49, and 50-69.

The STAI has been found to possess very good internal consistency and validity. Using their normative data, Spielberger et al., (1983) report Cronbach's alpha to range between .86- .95 for state anxiety and between .89- .96 for trait

anxiety. In their recent study by Grant et al., (2008), the STAI demonstrated good internal consistency with their pregnant sample of women, reporting Cronbach's Alpha at .95.

With regards to validity, concurrent validity between the trait anxiety scale and other measures of trait anxiety are fairly good. Correlations between the trait anxiety scale and the *IPAT Anxiety Scale* (Cattell & Scheier, 1963), the *Taylor Manifest Anxiety Scale* (Taylor, 1953), are given in the manual (Spielberger et al., 1983) as .75-.76 and .79- .80 respectively.

There are various cut-off scores for the STAI which have been used to identify likely cases of high state and trait anxiety. A cut-off of 40 has been used to identify highly anxious women in Australian studies with pregnant women (Grant et al., 2008; Hart & McMahon, 2006).While the higher score of 45 has been utilised with antenatal mothers and partners in other research (see Teixeira et al., 2009). For the purpose of this study 45 and above will be used as the cut-off to identify rates of high state and trait anxiety.

Edinburgh Postnatal Depression Scale

The Edinburgh Postnatal Depression Scale (EPDS) (Cox et al., 1987) is 10-item self-report questionnaire which requires the test-taker to read each question and to choose from four possible statements/responses which best describes how they have felt over the past seven days. Typical questions in the EPDS include "I have been so unhappy that I have had difficulty sleeping", "I have looked forward with enjoyment to things", and "the thought of harming myself has occurred to me". Each item is scored on a four point severity scale (0-3) and may yield a total score in the range of 0-30, with higher scores indicating greater symptom severity.

Extensively used, the EPDS has been found to have good internal consistency and validity. In their review of postnatal depression screening instruments, Boyd and colleagues (2005) found the EPDS to demonstrate moderate to good reliability, with .73-.87 (Cronbach's alpha) as the range of internal consistency, .53-.74 for test-retest, and .73-.83 (Spearman-Brown) for split-half reliability. With regards to validity, Boyd and colleagues (2005) reported varied sensitivity and specificity results. *Sensitivity* refers to the ability of a measure to correctly screen those who do have the disorder, i.e., true positive rate, and *specificity* refers to the capability of a measure to correctly screen those who do not have the disorder, i.e., true negative rate. Sensitivity rates were reported as ranging between 59-100% and specificity rates as 49-100% (Boyd et al, 2005). These results are similar to others, such as those found in the recently conducted review by Gibson, et al, (2009), where sensitivity was reported as ranging between 59-100% and specificity as 44-97%, when using an EPDS cut-off score of 9/10, and 57-100% and specificity from 93-99%, when using a cut-off point of 14-15.

As well as being well validated for use with women, the EPDS has also been found to be a reliable and valid instrument for use with fathers. In their study which examined paternal validation of the EPDS, Matthey et al., (2001) reported the internal consistency (Cronbach's alpha) of the EPDS with the men in their sample to be .81, and the split-half reliability (Spearman-Brown) as .78. With regard to validity, concurrent validity (Spearman's *r*) between the EPDS and Centre for Epidemiological Studies–Depression scale, was 0.62 (N=213, $p<0.001$; 95% C.I. = 0.59 to 0.86).

Different cut-off scores for the EPDS may be used to screen for likely cases of depression. A score equal to or higher than 10 for both mothers and

partners has been used as an indication to *screen* for a major depressive episode (see Miller, Pallant, & Negri, 2006; Teixeira et al., 2009).However, higher cut-off scores of 12 (Cox et al., 1987) and 14 for detecting probable antenatal depression in mothers (Gibson et al., 2009) have been recommended. For partners, the lower cut-off score of 11 has been recommended as optimal for the detection of probable depression (Edmondson, Psychogiou, Vlachos, Netsi, & Ramchandani, 2010). For the purpose of this study 12 and above will be used as the cut-off to identify rates of probable depression in mothers, and 11 and above for partners.

Recruitment

Participants were either approached and invited to take part by graduate and post-graduate research assistants, including the current researcher, or self-selected for participation upon reading/hearing of the study. Participants were recruited from a variety of locations, including the antenatal (Ward 54) and gynecology (Ward 51) units at Waikato Hospital, antenatal classes in Hamilton and the surrounding area. Posters and cards inviting participation in the research were also displayed throughout various stores, midwifery clinics, an ultrasound clinic, schools, childcare and kindergarten centres in the Waikato and Bay of Plenty area. Posters aimed at soliciting participants were also placed in a variety of school newsletters throughout the Waikato and Bay of Plenty districts.

All posters and cards advertising for participants contained a brief description of the research purpose, a contact phone number of the principle researcher and the web address of the online. Participants were invited to either phone for a questionnaire packet to be sent to them or to go to the web address and complete the questionnaires online.

Initially, as an incentive for participating in the research, participants were offered the chance to enter a monthly draw for a $60 gift voucher (see Appendix I). However, part way through the study funding allowed participants who completed a questionnaire packet to be given a $10 petrol voucher each.

Procedure

For the hospital group, after participants were screened and considered eligible to participate, the current researcher or another assistant approached the women (and partners, if present) requesting their participation in the study. Once consent was gained, participants were given a questionnaire packet (see Appendices A-J).Mothers whose partners were not present were asked to give a questionnaire packet, with the partner background information form (see Appendix D) to their partners to fill in. Of the mothers with partners (N= 205), 57 partners filled in a questionnaire. This gives a mother and partner response rate of 27.8%. Participants could opt to complete the paper questionnaires themselves, have the questions read to them by the researcher, or to fill in the questionnaires online. To help ensure that the participant's confidentiality was maintained and to identify each participant with their corresponding partner, each woman and partner was assigned a unique but not identifiable code. Participants were also given a resource sheet to direct their attention to available support services (see Appendix J).

For the community group, participants either filled in a paper form of the background information and questionnaires, went to the online website, or could opt to have a research assistant go through the questionnaires verbally.

Participants' data was then collated and entered into statistical analysis software by the current researcher. Data checks were completed by other

researchers, followed by complete checks of demographic information and questionnaires by the current researcher.

CHAPTER THREE

Results

The results section begins by describing demographic information, followed by the analyses to fulfil the aims of the research which were previously outlined in Chapter One. Firstly, using cut-offs for the STAI (trait) and the EPDS, rates of high anxiety and depressive symptoms in mothers and partners were determined. Then, to examine the relationship between anxiety and depressive symptoms in mothers and partners, rate of co-morbidity was calculated and Pearson's correlations were conducted. Next, to determine if there were any differences between mothers' and partners' anxiety and depression, one-way ANOVAs were conducted. Following this, Pearson's correlations were performed to determine if there was a relationship between couples' levels of anxiety and depression. Finally, correlation analyses were conducted to examine risk factors for antenatal anxiety and depression.

Demographics

As mentioned in Chapter Two, a total of 223 mothers and 57 partners participated in the larger descriptive research project from which the participants within the current study were obtained. As the broad goal of the current study is to examine the levels and relationships between anxiety and depression in antenatal mothers and partners, data could only be utilised where both mother *and* partner participants filled in the questionnaires. This meant that the sample of participants used in the current study, were a subgroup of a larger sample of participants. Thus, to determine if mothers whose partners filled in a questionnaire were representative of the overall sample of participants, statistical comparisons on the

demographic variables of age, gestation, ethnicity, education and income were conducted. To do this, the overall sample of mothers were divided into three groups: single mothers (Group S), mothers whose partners did not complete a questionnaire (Group P) and mothers whose partner did complete a questionnaire and who participated in the current study (Group PQ). One-way ANOVAs and chi squared analyses were then conducted to determine if there were any differences between these groups.

The demographic information of the participants in the overall sample is described below. This is followed by the analyses to determine if the sample used within the current study was representative of the overall sample.

Demographic information of participants in the overall sample

Demographic information for the overall sample and each of the three subgroups is presented in Table 3.1.Overall, 223 women participated in the study. Of these, 109 (48.9%) were recruited from the hospital and 114 (51.1%) from within the community. Of those in hospital, the average length of stay was nearly two and a half days and ranged from one to 16 days. As is shown in Table 3.1, the participants from the overall sample ranged from 18 to 41 years and were on average just under 29 years. Participant's length of gestation ranged from 6 to 42 weeks and had a mean of just over 30 weeks. Participants' ethnicity was categorized as New Zealand European, Māori, and Other. Participants who identified with multiple ethnic groups, such as NZ European/ Māori, were placed in the Other category. This was done to obtain the minimum count in each variable (i.e. ethnic group) for chi squared analysis to be conducted between groups. According to this categorization, over half of the participants identified as New Zealand European, followed by Māori, and Other. The group Other included those who identified as Indian, Pacific Islander, Other European, Filipino, Tongan

and Chinese. Nearly half of the participants held qualifications above that of a high school level, followed by those with a high school education and a small percentage did not have any formal qualifications. Most of the participants reported an annual household income of $30,000-$50,000. Of the remaining, one in five participants reported an income of less than $30,000, one in five reported between $50,000 and $70,000 and nearly one third reported their household income as over $70,000 per annum. 23 participants declined to report their level of income.

Analyses to determine sample representation

Upon examination of the three sub-groups, we can see in Table 3.1 that each group had different numbers in them; most participants had a partner who did not fill in a questionnaire (Group P), followed by those who had a partner who filled in a questionnaire (Group PQ), and by far the smallest group was single mothers (Group S). All groups were of a similar age, from 28 to 29 years on average, and one-way ANOVA analysis showed participants did not differ significantly in age. Gestation length across groups ranged from 29 ½ to just under 33 weeks and one-way ANOVA analysis revealed no significant difference between groups. With the exception of Group S, most were NZ/European, followed by Other and then Māori for Group P, or Māori closely followed by Other for Group PQ. Unlike both groups of mothers with partners, single mothers were predominantly Māori followed by NZ/European and Other. Chi squared analysis revealed an association between group membership and ethnicity. To determine the level of association between group membership and ethnicity, Cramer's V was conducted and showed a minimal association of $V = .182$, $p < .05$.

As is shown in Table 3.1, Group P and PQ were similar on their level of education. Most had a post-high school education, followed by those with a high school education and those with no formal qualifications. Single mothers were more likely to have a high school level education, followed by post-high school level and no formal qualifications. As participants who were single had a small group membership and less than expected cell counts in some categories on the variable of education, statistical analyses to reveal differences between the three groups was compromised. For this reason, Group S was omitted from the analyses comparing across the three groups. Chi squared analysis revealed no significant difference between Group P and PQ on the variable of education. As can be seen in Table 3.1 Group P and PQ were similar with regard to household incomes, with most earning between $30,000 and $100,000. However, single mothers were more likely to earn less money, with half earning less than $20,000 per annum. Chi squared analysis between Group P and group PQ revealed no significant difference between groups on level of income.

In summary, mothers whose partner participated in the current study differed on some demographic variables from single mothers, but did not differ from mothers whose partner did not fill in a questionnaire. Due to the relatively small proportion of single mothers, it was deemed that mothers whose partners did not fill in a questionnaire were more representative of the overall sample of participants. After analyses were conducted, it is concluded that mothers whose partners did fill in a questionnaire were representative of the overall sample.

Table 3.1

Demographic details of Overall Group & three sub-groups with statistics of demographic comparisons

	Overall Group	Mothers- Single (S)	Mothers- partners not fill in questionnaire (P)	Mothers-partners fill in questionnaire (PQ)	Statistic
	n=223	n=18	n=148	n=57	
Age	28.9 (SD6.235) Range 16-44	28.2 (SD 7.965) Range 18-41	29.01 (SD 6.066) Range 6-44	28.75 (SD 6.162) Range 16-40	$F(2, 218) = .854$, N.S
Gestation	30.25 (SD 7.736)	32.83 (SD 8.333)	29.47 (SD 8.164)	31.36 (SD 6.066)	$F(2,214) = 2.326$, N.S
Ethnicity					
NZ/European	133 (59.6%)	6 (33.3%)	94 (63.5%)	33 (57.9%)	$\chi^2(4) = 14.798$*
Māori	38 (17.0%)	8 (44.4%)	17 (11.5%)	13 (22.8%)	
Other	52 (23.3%)	4 (22.2%)	37 (25%)	11 (19.3%)	
Education					
No qualifications	15 (6.7%)	2 (11.1%)	11 (7.4%)	2 (3.8%)	$\chi^2(3) = 1.687$, N.S *a*
High school	79 (35.4%)	8 (44.4%)	49 (33.1%)	16 (30.8%)	
Above high school	111 (49.8%)	5 (27.8%)	78 (52.7%)	34 (65.4%)	
Annual household income					
Less than $20,000	25 (12.5%)	5 (50%)	12 (8.6%)	8 (15.7%)	$\chi^2(5) = 4.365$, N.S *a*
$20,000-$30,000	17 (8.5%)	1 (5.6%)	13 (9.4%)	3 (5.9%)	
$30,000-$50,000	46 (23.0%)	1 (5.6%)	31 (22.3%)	14 (27.5%)	
$50,000-$70,000	42 (21.0%)	1 (5.6%)	31 (22.3%)	10 (19.6%)	
$70,000-$100,000	39 (19.5%)	1 (5.6%)	31 (22.3%)	7 (13.7%)	
More than $100,000	31 (15.5%)	1 (5.6%)	21 (15.1%)	9 (17.6%)	

*Significant at $p < 0.05$ level

a comparison between group 2 and 3 only

The remainder of the results section focuses on the participants within the current study. The demographic characteristics, followed by relationship details for the participants are described below.

Demographic information of participants within the current study

A total of 57 women and 57 partners completed questionnaires which were used in this study (N= 114). 29 mothers (50.9%) were recruited from the hospital and 28 (49.1%) from the community. Of the mothers in hospital, mean length of stay was 2.214 days (SD 2.440) and ranged from one to 12 days.

Demographic information for the mothers and partners who are the focus of the current study is presented in Table 3.2. As is shown, partners were older than mothers by approximately a year and a half. An independent t-test was conducted and results indicated the difference in age was non-significant (t (111) = -1.349, N.S). The majority of the partners were male; however, the gender was unknown for two participants. Mothers were on average in their 31st week of gestation. Participants were from a variety of ethnic backgrounds; however, most mothers and their partners identified as NZ European. This was followed by Māori, and Other, which included Other European, New Zealand European/Māori, Tongan, Filipino, Afghani and Chinese. Chi squared analysis of any association between mothers and partners on the variable of ethnicity revealed no significant difference (χ^2 (2) = 2.189, N.S). Mothers and partners were similar in education levels; the majority had a post- high school education, followed by high school then no formal qualifications. The majority of the partner participants were employed and over one tenth identified as unemployed. The employment status of the remaining one tenth of participants was unknown. The annual household income of most participants was between $30,000 and $50,000. Over

half had annual incomes from $50,000 to over $100,000 and just over twenty percent earned less than $30,000. Six participants declined to respond to questions regarding income.

Table 3.2

Demographic details of mothers and partners in the current study

	Mothers	Partners
Age	28.75 (SD 6.16) Range 16-40	30.33 (SD 6.82) Range 16-42
Gender		
Male		55 (96.5%)
Unknown		2 (3.5%)
Gestation	31.36 (SD 6.066)	
Ethnicity		
NZ/European	33 (57.9%)	37 (66.1%)
Māori	13 (22.8%)	6 (10.7%)
Other	11 (19.3%)	13 (23.2%)
Education		
No qualifications	2 (3.8%)	4 (8.7%)
High school	16 (30.8%)	11 (23.9%)
Above high school	34 (65.4%)	31 (67.4%)
Employment		
Employed		44 (77.2%)
Unemployed		7 (12.3%)
Unknown		6 (10.5%)
Annual household income		
Less than $20,000	8 (15.7%)	
$20,000-$30,000	3 (5.9%)	
$30,000-$50,000	14 (27.5%)	
$50,000-$70,000	10 (19.6%)	
$70,000-$100,000	7 (13.7%)	
More than $100,000	9 (17.6%)	

Relationship details of the couples are shown in Table 3.3. As can be seen, the majority of participants were married with the remaining being in a de- facto relationship. The marital status of five couples was unknown. The majority of couples were currently in a relationship of between one and five year's duration, followed by five to ten years duration. Couples number of other children ranged from zero to three. Most reported having no other children; however, nearly half had one or two other children. Most participants had actively planned and were trying for their current pregnancy. All participants desired their pregnancy.

Table 3.3

Relationship details of mothers and partners in the current study

	Mothers & Partners
Marital Status	
Married	35 (67.3%)
De-facto	17 (32.7%)
Relationship length	
Less than 1 year	7 (12.3%)
1 to 4.99 years	22 (38.6%)
5 to 9.99 years	21 (36.8%)
10 or more years	6 (10.5%)
Number of other children	
0	24 (42.1%)
1	15 (26.3%)
2	13 (22.8%)
3	5 (8.8%)
Current pregnancy	
Not planned, not desired	Nil
Not planned but once pregnant, desired	13 (24.5%)
Desired, but not actively trying	11 (20.8%)
Planned and actively trying	29 (54.7%)

The following subsection focuses on the analyses in order to fulfil the research aims of this study.

1. Rates of anxiety and depression in the current sample

The first aim of this study is to determine the rates of high state anxiety, possible Generalized Anxiety Disorder (STAI-trait), and those with elevated depressive symptoms which are probable to meet criteria for depression. In order to determine the proportion of mother and partner participants with high anxiety and probable depression, cut-off scores were used for the STAI (state), STAI (trait) and EPDS. Similar to prior research (Teixeira et al., 2009) a cut-off of 45 or higher was used to identify high state and trait anxiety. As recommended by prior research (Cox et al., 1987) the cut-off of 12 was used to screen for *probable* cases of depression for women, and 11 for *probable* depression in partners (Edmondson et al., 2010).

The prevalence of state anxiety, trait anxiety and depression is presented in Table 3.4. As can be seen, rates of elevated state anxiety in mothers and partners were similar at 29.1% and 27.8% respectively. Similar rates of elevated trait anxiety were found with one in five mothers (20.0%) and partners (20.4%) being elevated in trait anxiety. With regard to *probable* depression, mothers were more likely to be depressed than partners with reported rates of 18.2% and 13.0% respectively.

Table 3.4

Participants who scored above cut-offs for elevated anxiety and depression

N=109	Mothers		Partners	
	N= 55		N= 54	
STAI (state)	≥45	16 (29.1%)	≥45	15 (27.8%)
STAI (trait)	≥45	11(20.0%)	≥45	11 (20.4%)
EPDS	≥12	10 (18.2%)	≥11	7 (13.0%)

2. Relationship between anxiety and depression in mothers and partners

The second aim of this study is to examine the relationship between anxiety, particularly trait anxiety and depression in mothers and partners. First, to identify the level of co-morbidity between anxiety and depression within mothers and partners, the proportion of participants who exceeded the cut-off for both the STAI-trait anxiety (which, as previously mentioned, will be used as an indication of possible Generalized Anxiety Disorder) and the EPDS (for probable depression) was calculated. This will be reported first. Second, to assess the degree of the relationship between anxiety and depression in mothers and partners, Pearson's correlation coefficients (*r*) were conducted. In order to do this, correlations were conducted separately for the mothers and the partners between the PSAS, STAI (state) anxiety, STAI (trait) anxiety and EPDS. The correlations between measures for mothers are reported first. This is followed by partners' correlations between the four measures.

Co-morbidity of anxiety and depression

The proportion of mothers who exceeded the cut-off for both trait anxiety

(GAD) and the EPDS (probable depression) was calculated. 6 mothers were elevated in both GAD and depressive symptoms. This indicates that 10.5% of pregnant women within this sample were co-morbid for anxiety and depression.

Following the same format as described above, results indicate that the 6 partners were elevated in both anxiety and depression symptoms. Again, this indicates that 10.5% of partners of pregnant women in this sample were co-morbid for anxiety and depression.

Correlations between measures for mothers and partners

Prior to analyses, scatter plot graphs were produced to check that the assumption of bivariate normality was not violated and to check for outliers which may affect the correlation values. Linearity was established and no outliers were found which indicated that assumptions were not violated. Thus correlation analysis was considered appropriate. To maintain continuity, the following interpretation of correlation coefficients will be used in this study: .10 for small, .30 for medium, and .50 for large (Green, Salkind, & Akey, 2000).
The analyses are explained as follows.

Correlations between measures for mothers

Correlations between measures for mothers are presented in Table 3.5. As can be seen, all of the measures were significantly positively correlated with one another (p <.01). This means that as scores increased on one measure, they also increased on the other measure. Except the PSAS and trait anxiety, all correlations were large. State and trait anxiety measures resulted in the highest correlation. State anxiety and PSAS were highly correlated, as were the EPDS with both state and trait anxiety. The lowest correlation, returning a medium-large effect, was between the PSAS and trait anxiety.

Table 3.5

Correlations between anxiety and depression measures for Mothers

N = 55	PSAS	STAI (state)	STAI (trait)	EPDS
PSAS	-	*r* = .687**	*r* = .414**	*r* = .546**
STAI(state)	*r* = .687**	-	*r* = .728**	*r* = .669**
STAI (trait)	*r* = .414**	*r* = .728**	-	*r* = .664**
EPDS	*r* = .546**	*r* = .669**	*r* = .664**	-

* Significant at $p < .05$ level (one tailed)
** Significant at $p < .01$ level (one tailed)

Correlations between measures for partners

Correlations between measures for partners are presented in Table 3.6 As can be seen, all of the measures were significantly positively correlated with one another. Except for PSAS and trait and PSAS and the EPDS, all correlations were large. The EPDS and trait anxiety returned the highest correlation, followed closely by state and trait anxiety. The EPDS was also highly correlated with state anxiety but was less associated with the PSAS. The lowest correlation was between the PSAS and trait anxiety which returned a medium correlation.

Table 3.6

Correlations between anxiety and depression measures for Partners

	PSAS	STAI (state)	STAI (trait)	EPDS
PSAS	-	*r* = .622** N = 53	*r* = .339** N = 53	*r* = .463** N = 54
STAI(state)	*r* = .622** N = 53	-	*r* = .750** N = 54	*r* = .693** N = 54
STAI(trait)	*r* = .339** N = 53	*r* = .750** N = 54	-	*r* = .768** N = 54
EPDS	*r* = .463** N = 54	*r* = .693** N = 54	*r* = .768** N = 54	-

* Significant at $p < .05$ level (one tailed)
** Significant at $p < .01$ level (one tailed)

It appears that all types of anxiety are highly correlated with each other. Trait anxiety and depression were also highly associated with one another, especially for partners, for whom the highest association was found between the two measures. These results are evidence to support the high degree of association and co-morbidity between anxiety and depression, especially in partners.

3. Differences between mothers' and partners' anxiety and depression

The third aim of this study is to examine the differences between the mothers' and partners' anxiety and depression. To do this, statistical analyses were conducted between mothers and partners on the four measures.

Prior to statistical analysis, the assumptions of normality and homogeneity of data were tested to determine whether parametric or non-parametric analysis should be conducted. Face validity for normality of data for mothers and partners was checked on the four measures by graphing the data in histograms with normality curves, followed by statistical analysis. Statistics used included the Kolmogorov-Smirnov test of normality and the Levene's test of homogeneity of variance. Results from normality and homogeneity of variance tests are presented in Table A, in the appendix section (see APPENDIX Q). As is shown, mother responses on the PSAS and partner responses on the STAI (state) and EPDS were not normally distributed. All other responses on the measures were normally distributed. Homogeneity of variance for mother and partner data on each measure was equal.

As parametric tests are deemed to be robust and may be able to cope with violations of normality assumptions, tests using both parametric (independent one-way ANOVAs) and non-parametric (Kruskal-Wallis) analyses were conducted. Results of the two tests for mothers and partners on the four measures are presented in Table 3.7. As can be seen, both tests show similar results, with ANOVA and Kruskal-Wallis analysis indicating a significant difference between mothers and partners on STAI (trait) and EPDS variables. Due to the similarity between parametric and non-parametric results, the parametric tests were considered able to cope with the aforementioned violations. Thus, parametric tests were continued in the analysis and reported as follows.

Responses on measures

As mentioned above, to determine if there were differences between the mothers' and partners' levels of anxiety and depression, one –way independent ANOVAs were conducted between mothers and partners on the four measures. Partial eta squared was also calculated as a measure of effect size. Means, standard deviations and results from the ANOVAs are presented in Table 3.8. As can be seen, for all measures of anxiety and depression women scored higher than their partners; however, only trait anxiety and depression showed significant differences. Effect sizes for these were respectively η_p^2=.048, and η_p^2= .051.

To summarize, mothers were significantly higher in trait anxiety and levels of depression than partners. No significant differences were found between mothers and partners on levels of state and pregnancy specific anxiety.

Table 3.7

Means, standard deviations, ANOVA and Kruskal-Wallis results

	Mothers		Partners		ANOVA	Kruskal-Wallis
	Mean	SD	Mean	SD		
PSAS	2.67	1.20	2.43	1.05	*F* (1, 113) = 1.21	*H* (1) = .67
STAI (state)	39.55	11.68	35.19	11.75	*F* (1, 109) = 3.78	*H* (1) = 3.46
STAI (trait)	37.76	8.92	33.41	10.54	*F* (1, 109) = 5.43*	*H* (1) = 5.61 *
EPDS	7.45	4.67	5.30	4.70	*F* (1, 109) = 5.78*	*H* (1) = 6.80 *

* Significant at $p<.05$

4. Relationship between couples' anxiety and depression

The fourth aim of this study is to examine the relationship between mothers' and partners' anxiety and depression. In order to do this, Pearson's correlation coefficients (*r*) were conducted to determine the degree of association between mothers' and partners' anxiety and depression on the four measures. These correlations are presented in Table 3.8. Correlations between mothers' and partners' on the same measures will be reported first. This is followed by the correlations of different measures of anxiety and depression between mothers and partners.

Mother and partner correlations on the same measures

As can be seen in Table 3.8, correlations between mothers' and partners' scores on the PSAS, STAI (state), STAI (trait) and EPDS were all positive and significant. This means that as mothers' scores increased, partners' scores also increased. In every case apart from trait anxiety, mothers' responses on each measure were correlated most highly with partners' responses on the same measure. Thus, mothers were more likely to be anxious around the pregnancy, state anxious or depressed when their partner was also, and vice versa. This suggests that pregnancy specific, state anxiety and depressive levels were highly concordant among the couples.

As is shown, the largest correlation between mothers and partners was for level of mood symptoms (EPDS). This is an indication that compared to levels of anxiety; levels of depressive symptoms were the most associated between mothers and partners. This was followed by mothers' and partner's state anxiety and pregnancy specific anxiety (PSAS) which returned large coefficients. The lowest correlation was that of trait anxiety which returned a medium-large correlation

coefficient. Thus, in comparison to trait anxiety, the more transient forms of anxiety (i.e. pregnancy specific and state anxiety) were more highly associated between mothers and partners.

Mother and partner correlations on the different measures

As is seen in Table 3.8, as mothers' pregnancy specific anxiety (PSAS) increased, partners' state, trait and depression levels increased. More specifically, mothers' pregnancy specific anxiety (PSAS) was highly correlated with partners' state anxiety and had medium correlations with partners' trait anxiety and levels of depression (EPDS). This suggests that mothers were more anxious about the pregnancy when partners' state anxiety was elevated but was less associated with partners' trait anxiety and depressive levels.

As mothers' state anxiety increased, this was related to an increase in partners' pregnancy specific anxiety, trait anxiety and levels of depression, and all correlations were of a similar medium-large size. This indicates that mothers' state anxiety was fairly equally associated with partners' levels of pregnancy specific and trait anxiety, as well as levels of depressive symptoms. Partners' state anxiety however, was correlated highest with mothers' depression levels, returning a large correlation, compared to medium correlations with mothers' PSAS and trait anxiety. This indicates that mothers may be fairly equally affected by partners' anxiety and depression, yet partners' were more state anxious when mothers were elevated in depression.

As can be seen, the correlation between mothers' trait anxiety and partners' depressive levels (EPDS) was large and with partners' state and trait anxiety levels medium-large. Similarly, partners' trait anxiety was correlated highest with mothers' levels of depression (as opposed to all other types of anxiety) as well. This suggests that trait anxiety in both partners was associated

highest, not with pregnancy specific, state, or trait anxiety, but with depression in the other partner.

Finally, as mothers' depressive symptoms increased, partners' pregnancy specific, state and trait anxiety increased also. The correlations between mothers' scores on the EPDS and both state and trait anxiety were large and fairly similar in size. The correlation coefficient between mothers' EPDS and partners' pregnancy specific anxiety was comparatively smaller. Partners' were more likely to be depressed when mothers' were high in trait anxiety and to a less degree state and pregnancy specific anxiety.

In summary, couples' anxiety and depression was highly correlated. Couples' were most likely to be pregnancy specific, state anxious and have elevated depression levels when the other was elevated on the same measure. This is evidence to suggest that couple' are highly concordant for anxiety (other than trait) and depressive levels. The largest correlation was for couples' depression. Mother's anxiety around the pregnancy was associated more with partners' anxiety; in contrast, partners' were more anxious about the pregnancy when mothers' were elevated in depression. Trait anxiety in both partners was most associated with the others' depression levels.

Table 3.8

Correlations between Mothers and Partners on the four measures

	Mothers			
Partners	PSAS	STAI (state)	STAI (trait)	EPDS
PSAS	*r* = .508** N= 56	*r* = .453** N = 54	*r* = .183 N = 54	*r* = .494** N = 54
STAI (state)	*r* = .390** N = 54	*r* = .595** N = 53	*r* = .346** N = 53	*r* = .572** N = 53
STAI (trait)	*r* = .272* N = 54	*r* = .423** N = 53	*r* = .391** N = 53	*r* = .560** N = 53
EPDS	*r* = .286* N = 54	*r* = .429** N = 53	*r* = .489** N = 53	*r* = .628** N = 53

* Significant at $p < .05$ level (one tailed)
** Significant at $p < .01$ level (one tailed)

5. Risk factors for antenatal anxiety and depression

The fifth aim of this study is to examine the risk factors for elevated antenatal anxiety and depression in mothers and partners. The variables which were used in the following analyses were chosen as they had previously been identified within the literature (see Chapter One) as risk factors for anxiety and depression. Initially, to fulfil this aim, multiple regression analyses were to be conducted. However, due to the lower than recommended number of cases in this study for this type of analysis (see Green, 1991) correlation analyses between demographic variables and the four measures were conducted. Pearson's correlation coefficients (r) were used for parametric demographic variables, including continuous dichotomous, and Spearman's rho (r_s) for non-parametric data. With regard to the variable of ethnic minority or majority, participants who identified as New Zealand European or Other European were placed into the majority category and all other participants were categorized as belonging to an ethnic minority.

Results for mothers are presented first, then partners. Finally, for those variables which contributed significantly to measures of anxiety and depression in mothers and partners, semi-partial correlations were conducted to explore how much each factor provided a unique contribution to scores on measures.

Mothers

Correlations between demographic variables and scores for each of the measures for mothers are presented in Table 3.9. As is shown, there were significant (at the $p<.05$ level) negative correlations between mothers in hospital (or not) and levels of pregnancy specific anxiety (PSAS), state anxiety and levels of depression (EPDS). This indicates that compared to mothers in the community, mothers in hospital had higher anxiety around the pregnancy, state anxiety and

levels of depressive symptoms. These results suggest that pregnancy complications (for which hospitalization is sought) are risk factors for both pregnancy specific and state anxiety and higher depressive symptoms in pregnant mothers.

Significant negative correlations (at the $p<.05$ level) between level of income and trait anxiety and depression (EPDS) were found. This indicates that as income increases levels of trait anxiety and depression decreases. These results are evidence to suggest that low income is associated with higher levels of trait anxiety and may be a risk factor for antenatal depression.

A significant positive correlation between mothers' ethnicity (New Zealand European/other European or not) and PSAS and state anxiety (at $p<.05$) was found. This indicates that membership to an ethnic minority may increase the risk of pregnancy specific and state anxiety.

Significant negative correlations between mothers' age and trait anxiety (at $p<.01$) and depressive symptoms (EPDS) (at $p<.05$) were found. This indicates that as mothers' age the less likely they are to experience trait anxiety and higher levels of antenatal depressive symptoms. These results suggest that a younger age at pregnancy may be a risk factor for higher levels of trait anxiety and antenatal depression. All other correlations were not significant.

In summary, risk factors for mothers' increased pregnancy specific anxiety included pregnancy complications and belonging to an ethnic minority. Ethnicity was also a risk factor for increased state anxiety, as was pregnancy complications. Younger age and low income was associated with higher trait anxiety. Risk factors for depression included pregnancy complications, low income and younger age.

Table 3.9

Correlations between demographic variables and measures for mothers

Demographic variable	PSAS	STAI (State)	STAI (trait)	EPDS
Partners' unemployment	r=.037 N=51	r=-.004 N=49	r=.070 N=49	r=.102 N=49
Number of other children	r=.150 N=57	r=.175 N=55	r=.083 N=55	r=.089 N=55
Hospitalised for pregnancy complications or not	r=-.250* N=57	r=-.282* N=55	r=-.105 N=55	r=-.230* N=55
Level of income	r_s=-.026 N=57	r_s=-.150 N=55	r_s=-.246* N=55	r_s=-.311* N=55
Level of education	r_s=.006 N=52	r_s=-.127 N=50	r_s=-.184 N=50	r_s=-.226 N=50
Ethnic majority or minority	r=.221* N=57	r=.237* N=55	r=.141 N=55	r=.164 N=55
Age	r=-.127 N=56	r=-.204 N=54	r=-.338** N=54	r=-.315* N=54
Gestation length	r=-.081 N=57	r=-.072 N=55	r=-.113 N=55	r=-.222 N=55

* Significant at p<.05 (one-tailed)
** Significant at p<.01 (one-tailed)

Partners

Correlations between demographic variables and scores on measures for partners are presented in Table 3.10. As can be seen, there was a significant negative association ($p<.05$) between level of education and pregnancy specific anxiety (PSAS). This indicates that as level of education decreases, levels of pregnancy specific anxiety increases. This is evidence to suggest that low education may be a risk factor for increased pregnancy specific anxiety.

A significant ($p<.01$) positive relationship was found between ethnicity (New Zealand European/ other European or not) and pregnancy specific anxiety (PSAS). This suggests that membership to an ethnic minority may be a risk factor for increased pregnancy specific anxiety.

There was a significant ($p<.05$) negative relationship between length of gestation and state anxiety. This indicates that the closer mothers are to giving birth, the less state anxious partners may be. This suggests that the early stages of the gestational period may be a risk factor for increased state anxiety in partners.

There was also a significant ($p<.01$) positive relationship between ethnicity and state anxiety which indicates that being a member of an ethnic minority is a risk factor for higher state anxiety. All other correlations were not significant.

In summary, the only risk factors found were for the more transient forms of anxiety. Low education and belonging to an ethnic minority increased risk of pregnancy specific anxiety. Ethnicity and early gestation were found to increase risk of elevated state anxiety.

Table 3.10

Correlations between demographic variables and measures for partners

Demographic variable	PSAS	STAI (State)	STAI (trait)	EPDS
Partners' unemployment	r=.141 N=50	r=.171 N=48	r=.116 N=48	r=.042 N=48
Number of other children	r=-.022 N=56	r=.010 N=54	r=-.117 N=54	r=-.042 N=54
Hospitalised for pregnancy complications or not	r=-.204 N=56	r=-.105 N=54	r=.057 N=54	r=-.032 N=54
Level of income	r_s=-.107 N=56	r_s=-.198 N=54	r_s=-.066 N=54	r_s=-.174 N=54
Level of education	$r_{s=}$-.343* N=45	r_s=-.127 N=43	r_s=-.181 N=43	r_s=-.169 N=43
Ethnic majority or minority	r=.325** N=55	r=.334** N=53	r=.166 N=53	r=.223 N=53
Age	r=-.122 N=56	r=-.139 N=54	r=-.093 N=54	r=-.094 N=54
Gestation length	r=-.107 N=56	r=-.279* N=54	r=-.078 N=54	r=-.110 N=54

*Significant at p<.05

Contribution of risk factors

Multiple risk factors were found to be significantly contributing to mothers' anxiety and depressive levels, and partners' pregnancy specific and state anxiety. In order to determine the unique contribution of each risk factor on the measures, semi-partial correlations were conducted. This enabled the contribution of one variable while controlling for the others to be determined. Mothers' risk factors will be explored in further detail, followed by partners'.

Mothers

Significant relationships were found between the PSAS, hospitalisation and ethnicity; state anxiety, hospitalisation and ethnicity; trait anxiety, low income and age; and the EPDS, hospitalisation, income and age. Part correlation results are presented in Table 3.11. As is shown, after controlling for the influence of the other variables, there were no significant relationships between each risk factor on their own and the PSAS, STAI (state), STAI (trait) and EPDS. This indicates that the risk of developing anxiety and increased depressive symptoms was not due to one individual factor, rather each variable contributed to increased anxiety and depressive levels.

Table 3.11

Semi-partial correlations for risk factors for Mothers

	PSAS		STAI (state)		STAI (trait)		EPDS	
Demographic variable	Part correlation	Statistic	Part correlation	Statistic	Part correlation	Statistic	Part correlation	Statistic
Hospitalised for pregnancy complications or not	-.201	*t* = -1.55	-.229	*t* = -1.75			-.233	*t* = -1.86
Level of income					-.109	*t* = -.836	-.210	*t* = -1.67
Ethnicity	.162	*t* = 1.25	.171	*t* = 1.30				
Age					-.214	*t* = -1.63	-.140	*t* = -1.11

*Significant at $p < .05$ level

Partners

Significant relationships were found between the PSAS, level of education and ethnicity, and state anxiety, gestation length and ethnicity. Part correlation results are presented in Table 3.12. As is shown, after controlling for the influence of gestation length, ethnicity significantly (p <.05) contributed to elevated state anxiety scores. This indicates that membership to an ethnic minority is, on its own, a significant risk factor for the development of state anxiety in partners of antenatal mothers. All other relationships were not significant. This indicates that although significantly contributing to increased PSAS and state anxiety, the factors of education, gestation length and ethnicity (with regards to PSAS anxiety) were not individually significantly contributing to increased scores on the measures.

Table 3.12

Semi-partial correlations for risk factors for Partners

	PSAS		STAI (state)	
Demographic variable	Part correlation	Statistic	Part correlation	Statistic
Ethnicity	-.227	t = 1.57	.298	t = 2.31*
Level of education	-.278	t = -1.93		
Gestation length			-.259	t = -2.00

*Significant at p <.05 level

In summary, multiple risk factors were associated with mothers' anxiety and depression. However, no single risk factor was found to increase mothers' anxiety and depression on its own, rather multiple risk factors contributed. Partners' pregnancy specific and state anxieties were associated with several risk

factors. Only one, belonging to an ethnic minority, was found to be an independent risk for increasing partners' state anxiety.

CHAPTER FOUR

Discussion

The overall aims of this research were to examine the extent to which anxiety and depression affect New Zealand parents during pregnancy, the relationships between anxiety, depression and couples, and to identify risk factors for antenatal mental anxiety and depression. The results of this study indicate that a large proportion of mothers and partners experience elevated anxiety and depression. Furthermore, comorbidity between anxiety and depression was found in one out of ten mothers and partners and a high association between levels of anxiety and depressive symptoms was found. Results indicate that mothers do not experience higher pregnancy or state anxiety; however, they do experience significantly higher levels of trait anxiety and depression than partners. Couples' were highly concordant for all types of anxiety and depression, with the association between couples' depression found to be the highest. Although multiple risk factors were found to increase the risk of anxiety and depression in this sample, only ethnicity was, on its own, significantly associated with elevated state anxiety in partners.

1. Rates of anxiety and depression

As measured with the STAI-state (Spielberger et al., 1987), results indicate that 29.1% of mothers were elevated in state anxiety in the current sample. This is fairly consistent with prior literature during the antenatal period, in that it falls between the reported prevalence rates for state anxiety of 15.7% (Teixeira et al., 2009) and 59.5% (Faisal-Cury & Menezes, 2007). However, the rate found in this sample of women was much lower than that of 59.5% and this may be partially attributed to the difference in samples. While Faisal-Cury and

Menezes (2007) sample size was large (N=432), it was comprised of urban women from São Paulo who were attending an outpatient obstetric clinic. It is possible that the entire sample of women were having obstetric 'difficulties' and therefore were at higher risk of elevated anxiety (Da Costa et al., 1999) compared to the women in this sample, where half were recruited from the community. The rate of state anxiety from the current sample is twice that of Teixeira and colleagues (2009). This may be explained by the current study's smaller sample size (which may have inflated the results). In addition, it is apparent that Texeira and colleagues' (2009) sample was not ethnically diverse, constituting a very high proportion of Caucasian women (92.1%). As ethnic minority has been found to be a risk factor for elevated anxiety (Grant et al, 2008) this could account for the higher reported rates of state anxiety within the current sample in which just under 30% were of non-European background.

Results from this study found that 27.8% of partners were elevated in state anxiety. The only study, to the author's knowledge, which examined prevalence of paternal antenatal anxiety with a self-report measure, was that by Teixeira and colleagues (2009). The rate found within this study is much larger compared to their rate of 8.76%. This discrepancy may be explained by the same rationales as for the women sample above; that the discrepancy is due to differences in sample size and due to the ethnic diversity of the current study's sample which may have elevated the rates of state anxiety.

According to the STAI-trait, 20.0% of mothers were elevated in trait anxiety which, in this study, gives an indication of the level of possible Generalized Anxiety Disorder (GAD). This result sits within the findings of the broader literature for anxiety *disorders* within the antenatal population (Grant et al., 2008; Uguz et al., 2010). However, the rate reported in the current study is

lower than other antenatal research (33% to 45.3%) (Grant et al., 2008; Faisal-Cury & Menezes, 2007) which utilized the same self-report measure (STAI) and cut-offs. Concerning Faisal-Cury and Menezes's (2007) study, the difference in reported rates may be due to, the previously discussed factor of different research populations. However, this anomaly is difficult to explain for Grant and colleagues' (2008) study. Although both this study and that of Grant et al., (2008) came from similar research populations, the current study had a much lower sample size, and a much higher proportion of less educated and non-Caucasian participants. These factors should theoretically increase risk of trait anxiety for the current sample. Therefore, to understand and to offer relevant explanation, further investigation is required.

Furthermore, the rate (20.0%) found in the current study is notably higher than the figure (7.5%) identified in New Zealand research (Oakley-Brown et al., 2006) for rate of GAD in women. This may be due to the numerous reasons. First, this may be due to the different assessment tools used to determine prevalence rates in each study. Self-report instruments (such as the EPDS and STAI) have consistently reported higher rates of symptoms than studies which have utilized more precise diagnostic instruments (Wee et al., 2010). Furthermore, although STAI-trait anxiety has been conceptualized as similar to GAD (Austin et al., 2006), it is not equivalent to the diagnostic criteria for GAD. This may have led to a decreased level of accuracy within the current study's rate of estimated GAD. In addition, Oakley-Brown et al., (2006) had a much larger research population of over 12,000 participants. It is possible that the smaller sample size utilized in this study could have inflated rates.

Results for partners indicate that 20.4% of the current sample was elevated in trait anxiety. The author did not find any published research on trait anxiety

during the antenatal period, which highlights the benefit of this study to the wider literature. However, the rate within the current study is much higher than estimates of prevalence of GAD (4.4%) in the general population (Oakley-Brown et al., 2006). This may be due to the similar reasons highlighted above for female rates of elevated STAI-trait anxiety (i.e., different assessment tools/measures and decreased level of accuracy and validity for estimating GAD with non-diagnostic measures).

Utilizing the Edinburgh Postnatal Depression Scale (EPDS) (Spielberger et al., 1983) 18.2% of mothers in the current sample were classified as having *probable* depression. This is fairly consistent with the estimated rates found within the general population (20.3%) (Oakley-Brown et al., 2006); however, was slightly higher than the 6% to 16% range found in the review by Halbreich (2004) on prevalence for diagnosable mood disorders during pregnancy. This, as previously discussed, may be due to the less rigorous self-report measure used in the current study. The rate of *probable* depression found in this study is also consistent with prior research, utilizing similar self-report measures, during the antenatal period (12%-30%) (Teixeira et al., 2009; Faisal-Cury & Menezes, 2007).

Results indicate that 13.0% of partners in the current sample were classified as having *probable* depression. This is consistent with previously reported rates for men outside of the antenatal period (11.4%) (Oakley et al., 2006). During the antenatal period, the rate of partners' depression within the current study is marginally higher than the 5% to 12% range found within other antenatal research (Teixeira et al., 2009; Matthey et al., 2000; Buist et al., 2003). The study by Matthey et al., (2000) returned a 5.4% rate of elevated depressive symptoms in partners. The rate found within the current study differs as a lower,

more sensitive, cut-off was used (≥11) compared to the cut-off employed by Matthey et al., (2000) (>12). The lower cut-off used in the current study would have compromised the specificity and thereby allowed more participants to register above the cut-off threshold. In addition, Matthey et al., (2000) discussed the presence of an under-reporting bias found in their sample of male participants. This is also likely to have contributed to the lower reported rates of depression found within their study.

2. Relationship between anxiety and depression in mothers and partners

10.5% of women and 10.5% of partners were identified as having co-morbid trait anxiety and depression within this study. This is consistent with prior research which has identified the high association between trait anxiety and depression (Parker & Brotchie, 2010). Furthermore, the rates of co-morbidity are consistent with prior research during the antenatal period (Teixeira et al., 2009), yet are slightly higher for the male participants in this sample compared to the male participants in their sample. As discussed, our sample had a higher proportion of participants from ethnically diverse backgrounds which may go some way in explaining the discrepancy.

The findings from this study further demonstrate the high degree of association between trait anxiety and depressive levels (r= .664 and r= .768, for women and men respectively). In particular, the results from this study indicate that trait anxiety and depression, especially for partners, are highly associated. Moreover, the degree of association found within this study replicates findings from previous correlation studies (Wetherell et al., 2001) outside of the antenatal

period, lending evidence to support the co-morbidity and high degree of association between anxiety and depression.

3. Gender differences in anxiety and depression

The results indicate that mothers and partners were no different, on average, for state and pregnancy specific anxiety. The literature on state anxiety during the antenatal period is sparse, and as mentioned previously, is inconsistent. The findings in the current study conflict with those by Field et al., (2006) who reported that partners were significantly higher in state anxiety than mothers, and are not in agreement with Teixeira et al., (2009) where mothers reported significantly higher state anxiety than partners. Further research would help to clarify the differences between genders for antenatal state anxiety. In addition, an under-reporting bias in anxiety, which has been posited as a rationale for the gender difference in anxiety (Pierce & Kirkpatrick, 1992; Egloff & Schmukle, 2004), was not supported, for state anxiety in particular, in the current study. Moreover, it may be that the more transient forms of anxiety are less associated with the gender difference, than trait anxiety (McLean & Anderson, 2009).

Similar proportions of women and men within this study were elevated in trait anxiety (20.0% and 20.4% correspondingly). These similar reported rates of anxiety may seem to directly conflict with the finding that women were significantly more trait anxious than men. Upon examination of the risk factors associated with elevated trait anxiety for partners within this sample, no factors were found to be associated with trait anxiety. Therefore, this does not explain the higher than expected proportion of men with elevated trait anxiety in this sample of participants. Although similar proportions of men and women within this sample were elevated in trait anxiety, the findings of this study indicate that

women still experience *on average* significantly higher trait anxiety. These findings support research in the general population for the gender difference in anxiety (Kessler et al., 1994; Oakley et al., 2006) and in particular trait anxiety (McLean & Anderson, 2009). According to previous research, women may have a higher propensity for developing anxiety disorders due to pre-existing personality dynamics (higher trait anxiety) combined with negative affectivity (McLean & Anderson, 2009). The authors concluded that these factors likely intersect with broader contextual issues, in particular, gender specific socialization. It light of this, it is likely that the mother participants in this sample may be more likely to report trait anxiety due to socialization processes which enable this to occur. This is evidenced by the significantly higher average of mothers' trait anxiety compared to partners. Even though several men exceeded the cut-off for high trait anxiety, it is difficult to determine if there was an under-reporting bias as previous researchers have suggested as explanation for the gender difference (Pierce & Kirkpatrick, 1992; Egloff & Schmukle, 2004). Several partner participants reported low scores between 20 and 22 (20 is the minimum score), however, this many low scores may not be sufficient in identifying a reporting bias, and is therefore inconclusive.

The findings indicate that mothers are more likely to experience elevated depression than partners. Mothers reported higher rates of depression than partners (18.2% and 13.0% respectively). Furthermore, mothers on average experienced significantly higher levels of depression than partners. This is consistent with prior research both outside of (Kessler et al., 1994; Oakley et al., 2006; Kessler et al., 1993) and during pregnancy (Matthey et al., 2000). The literature around the gender difference in depression seems to have discounted the explanation that hormonal changes during pregnancy are responsible for the onset

of depression (Yonkers et al., 2000; Kessler, 2003). Thus, it is necessary to look further afield. It is likely that biological and genetic factors specific to women, combined with stressful events (Kessler, 2003), such as pregnancy and the onset of motherhood, may explain the greater prevalence of depression in mothers. In addition to this, the EPDS used in the current study may have failed to identify symptoms which previous researchers (Moller-Leimkuhler et al., 2004) have found to be associated with males' expression of depression, such as aggressiveness, irritability and anti-social behaviour. Although not assessed with the measures used, it is possible that these symptoms of male's depression were present in the sample and was therefore not detected in this study. Moreover, the literature has indicated that men's tendencies to self-medicate rather than seek help for their underlying affective state may under-represent the actual prevalence of depression in men (Cochran & Rabinowitz, 2000; Chuick et al., 2009). It is possible that this tendency may have led to an under-reporting bias, whereby partners' self-management strategies masked the true symptoms. Further research would help to explicate the matter.

4. Relationship between mothers' and partners' anxiety and depression

Results from this study indicate that couples' anxiety and depression are highly associated. This is consistent with the literature in the general population (i.e. outside of pregnancy) (Meyler et al., 2007; Tower & Kasl, 1996; Westman & Vinokur, 1998; Dubuis-Stadelmann et al., 2001) and during the perinatal period (Ballard et al., 1994; Roberts et al., 2006; Field et al., 2006; Areias et al., 2006). The highest association within the current study was found between depression in couples. This is consistent with previous research (Jones & Fletcher, 1993;

Whisman et al., 2004; Low et al., 2007) which highlights that depressive levels are more associated between couples than anxious symptoms.

Although trait anxiety was found to be least associated between couples, it was still significantly correlated. This is in disagreement with Dubuis-Stadelmann et al., (2001) who found no association between couples for neurotic traits. This may be due to different measures used to identify trait anxiety and neuroticism and the subtle differences between definitions of the two constructs. Positive Assortative Mating theory (Godoy et al., 2000), where partners choose a mate similar to themselves, is nonetheless supported by the current findings.

The degree of association between couples' anxiety (in particular trait anxiety) and depression in the current sample was high. The finding are higher than in previous literature examining couples outside pregnancy (Whisman et al., 2004; Jones & Fletcher, 1993; Butterworth & Rodgers, 2006; Dubuis-Stadelmann et al., 2001), and also during (Matthey et al., 2000). It may be likely that associations between couples are higher during this period due to the common stressor of pregnancy (Whisman et al., 2004; Westman & Vinokur, 1998) for which, half of the sample of mothers were hospitalized for pregnancy complications. With regard to the study by Matthey et al., (2006), as far as the author could tell, the sample used in their study was not recruited from inpatient clinics or units, which may partly explain the higher rates found within the current project.

It is interesting that pregnancy complications were associated with an increase in mothers' pregnancy specific state anxiety (see the following subsection). However, pregnancy complications in the mothers were not associated with an increase in partners' anxious and depressive symptoms. Yet, there was a high correlation between mothers' and partners' pregnancy specific

anxiety, state anxiety and level of depressive symptoms. Accordingly, it is possible that empathetic crossover (Hatfield et al., 1994), where partners develop a natural crossover in emotional states, may have occurred from mothers' emotional states to affect their partners' emotional state, thereby resulting in a high degree of association between couples' anxiety and depression, as found here.

5. Risk factors for antenatal anxiety and depression

For mothers, there were no factors on their own that were found to increase risk of either elevated anxiety or depressive levels. This gives evidence to suggest that risk may be multi-faceted, in that it stems from a combination of genetic, biological and psycho-social factors (Engel, 1977). Nevertheless, certain risk factors were found to significantly increase risk of elevated anxiety and depressive levels in combination. The risk factors for maternal anxiety (state and pregnancy specific) within the current study were found to be pregnancy complications and belonging to an ethnic minority. This is consistent with the literature both outside of the antenatal period (for ethnicity) (Oakley-Brown et al., 2006), and during (Da Costa et al., 1999; Grant et al., 2008; Hicks et al., 2009). No association was found between young age and low level of education and risk of elevated state anxiety within the current study, where prior research has identified these as are risk factors for state anxiety (Faisal-Cury et al., 2007). Faisal-Cury et al., (2007) had a majority of participants with less than high-school qualifications/education which may have increased the bias towards low education as a risk factor for increased state anxiety. The sample of participants within the current study were fairly well educated with most having post-high school qualifications. Correspondingly, the non-association between low

education and state anxiety in the current sample may have been skewed by the relatively high proportion of educated mother participants in this sample.

Younger age and low income were associated with higher trait anxiety for mothers. The findings are consistent with Faisal-Cury et al., (2007) however the authors also found that ethnic minority and low education level were risk factors for trait anxiety. Similar to the rationale above, this may be due to different sample demographics, such as higher education level.

Maternal risk factors for depression were found to be a combination of pregnancy complications, low income and younger age. These are consistent with previous research (Halbreich, 2004; Leigh & Milgrom, 2008; Ryan et al., 2005; Kowalenko, et al., 2000; Brandon et al., 2008). Inconsistent with previous research (Halbreich, 2004; Ryan et al., 2005), no association between ethnic minority, low level of education and greater number of children was found.

For partners' risk factors, only ethnic minority was found to be, on its own, significantly related to increased risk of anxiety (specifically state anxiety). This is in agreement with previous literature (Carr & McNulty, 2006) outside of the antenatal period. The other risk factors were only significant in combination with one another. Nevertheless, factors which increased risk of state and pregnancy specific anxiety includes low education and earlier in the gestation period. This is consistent with Deater-Deckard et al., (1998), who found that low education was associated with anxiety. However, the finding that the earlier period of gestation is a risk factor for anxiety is inconsistent with research by Condon et al., (2004) who emphasized the later stages of gestation as increasing the risk of anxiety for partners. This may be due to the different measures used to assess anxiety, where in the current study pregnancy specific anxiety was also assessed.

Interestingly, no risk factors for partners' depression were found in the current study. This is contrary to other research by Deater-Deckard et al., (1998), who found that unemployment was a risk factor for paternal depression. This discrepancy may be due to different definitions of unemployment. For the purposes of the current study, unemployment was defined as any occupation other than a paid one. Approximately half of those who were placed in the unemployed category were either students, or full-time stay at home dads. It is possible that these occupations (while not paid) were protective factors for the development of depression.

Limitations

There are several limitations of the current study. Firstly, the PSAS, STAI and EPDS are self-report measures which may be subject to response bias, and in particular, it is possible some of the participants may have been 'faking good' for fear of negative evaluation or repercussions. This may have led to a positive skew in the data.

As previously mentioned, the use of self-report measures is not as rigorous as utilizing diagnostic tools to determine rates of disorders (Wee et al., 2010). Caution is therefore advised in the interpretation of the results pertaining to the rates and prevalence of disorders, rather, they should be viewed as elevated levels of symptoms. Furthermore, the use of trait anxiety as a measure of estimated GAD may have limited the validity of results with regard to prevalence.

Due to the use of self-report measures, participants' responses were restricted, which meant that elaboration of answers was not possible. In addition to the measures used, the use of semi-structured interviews to gather more

information around participants' experiences and opinions would enable valuable participant directed information to be gathered.

Another limitation with this study is that measures of the more 'male' symptoms of depression were not used. As identified in the literature in Chapter One, men's expression of depression may be in atypical symptoms which were not assessed in this study. This may be beneficial for future research to consider.

Due to the difficulty accessing partners to ask if they would like to participate, a low response rate of partner participants was observed. The small sample size that resulted may have decreased statistical power, indeed, multiple regression analyses would be worthy of consideration for future analyses.

Conclusion

This study was fairly consistent with the findings of previous literature and has also greatly extended the knowledge around the mental health issues of expectant parents in New Zealand/Aotearoa.

Future research may benefit from larger sample sizes and the use of a mixed methodological design to gain more depth of understanding into the experiences of expectant parents. In addition, qualitative investigation into the psychosocial needs of parents during the antenatal period, especially those with pregnancy complications, may help to clarify the needs of antenatal parents and help guide future interventions and services for expectant parents. Further to this, additional factors which were not examined here, such as social and environmental factors, could help to further elucidate and contextualize the risk factors for expectant parents.

The array of negative outcomes from antenatal anxiety and depression and the relatively high degree of anxiety and depression found not only within expectant mothers but partners as well, signifies the need for adequate support services to be put in place. Furthermore, multiple risk factors were identified in this research with ethnicity for partners and pregnancy complications, ethnicity and young age for mothers being foremost. These factors identify vulnerable groups who may benefit from targeted support “interventions”. To the author’s knowledge, there are currently no screening tools in place for parents who are in antenatal inpatient units experiencing pregnancy complications. This may help to “catch” anxious and depressed parents on entry to the clinics, whereby support strategies may be implemented for those identified as in need.

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APPENDICES

APPENDIX A

Department of Psychology
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Private Bag 3105
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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 B

Department of Psychology
The University of Waikato
Private Bag 3105
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Telephone 64-7-856 2889
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Stress and Pregnancy Project
Partner 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 and their partners cope with medical problems during pregnancy. We would like to ask you to participate in this project, which involves filling in some questionnaires (or answering questions in person, if you prefer).

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, health, and health care. They should take about 20-30 minutes to fill out individually, or maybe 30-45 minutes if you want to do them in an interview.

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 the computer files. As a small thank you, we are also offering a chance at a draw for a $60 gift voucher; if you fill this entry form in, it will be kept separate from your questionnaires.

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 whether 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 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.

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THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

University of Waikato
Psychology Department

CONSENT FORM

PARTICIPANT'S COPY

Research Project: Prenatal Complications and Psychological Stress

Name of Researchers: Carrie Cornsweet Barber, Ph.D.
Nicola Starkey, Ph.D.

I have received an information sheet about this research project or the researcher has explained the study to me. I have had the chance to ask any questions and discuss my participation with other people. Any questions have been answered to my satisfaction.

I agree to participate in this research project and I understand that I may withdraw at any time. I agree that my midwife or physician may provide information about me to the researcher (as detailed in the Participant Information Sheet). If I have any concerns about this project, I may contact the convenor of the Research Ethics Committee (Dr Robert Isler, phone 838 4466 ext. 8401, e-mail r.isler@waikato.ac.nz).

Participant Name (please print):_____

Date: _____

Signature: _____

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THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

University of Waikato

Psychology Department

CONSENT FORM

RESEARCHER'S COPY

Research Project: Prenatal Complications and Psychological Stress

Name of Researchers: Carrie Cornsweet Barber, Ph.D.
Nicola Starkey, Ph.D.

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Participant Name (please print): _____

Date:_____

Signature: _____

APPENDIX D

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THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

University of Waikato
Psychology Department

CONSENT FORM

PARTICIPANT'S COPY

Research Project: Prenatal Complications and Psychological Stress

Name of Researchers: Carrie Cornsweet Barber, Ph.D.
Nicola Starkey, Ph.D.

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Date:_____

Signature: _____

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University of Waikato

Psychology Department

CONSENT FORM

RESEARCHER'S COPY

Research Project: Prenatal Complications and Psychological Stress

Name of Researchers: Carrie Cornsweet Barber, Ph.D.
Nicola Starkey, Ph.D.

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I agree to participate in this research project and I understand that I may withdraw at any time. If I have any concerns about this project, I may contact the convenor of the Research Ethics Committee (Dr Robert Isler, phone 838 4466 ext. 8401, e-mail r.isler@waikato.ac.nz).

Participant Name (please print): _____

Date:_____

Signature: _____

APPENDIX E

Instructions for filling in forms

- If you would rather talk with someone and have her fill in the forms, please let us know—call 07 838 4466 ext 6685.
- 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, except the consent form and the contact form.**
- When you've finished the questionnaires, please put them in the prepaid envelope and post it.
- If you want to enter the draw for the $60 gift card, fill in that form and post it with the questionnaires—it will be separated from your other forms and entered into the draw, which will take place once per month from all the forms returned that month.
- We are hoping to do a follow-up study later on, after your baby is born. If you might be willing to be in that study, we would appreciate knowing that now, and having your contact information so that we can contact you. If you are willing, please fill in the "Follow-up Contact Form." If you do this, you are not signing up for the study or giving consent to participate in it; this is just consent for us to contact you later and tell you about the study, and ask if you would like to participate in it.
- If you have questions, please call Carrie at 07 838 4466 ext 6685.

If you prefer to fill in the forms online:

- Online, go to http://psychology.waikato.ac.nz/surveys/mothers/index.htm
- There is a consent form that explains the study

- 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
- You do not need to complete a paper consent form
- There will be an opportunity to enter the gift card draw and consider being in the follow-up study online

APPENDIX F

Instructions for filling in forms

Partner forms

- If you would rather talk with someone and have her fill in the forms, please let us know—call 07 838 4466 ext 6685.
- First, read the information sheet and consent form.
    - If you have any questions, call 07 838 4466 ext 6685.
    - If you don't have any questions, sign both copies of the consent form; put the one that says "researcher's copy" in the envelope, and keep the other one. You may also keep the information sheet.
- 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, except the consent form.**
- When you've finished the questionnaires, please put them in the envelope provided post them directly to us.
- If you want to enter the draw for the $60 gift card, fill in that form and post it with the questionnaires—it will be separated from your other forms and entered into the draw, which will take place once per month from all the forms returned that month.
- If you have questions, please call Carrie at 07 838 4466 ext 6685.

If you prefer to fill in the forms online:

- Online, go to http://psychology.waikato.ac.nz/surveys/mothers/index.htm and click on the link that says "partner infosheet" or go direction to:
    - http://psychology.waikato.ac.nz/surveys/mothers/online%20Pa%20information%20sheet.htm

- There is a consent form that explains the study
- 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
- There will be an opportunity to enter the gift card draw online

APPENDIX G

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.

APPENDIX H

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?_____

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)

Have you had medical treatment for infertility (please any that apply)?

a. No
b. Evaluation and some advice, no intervention
c. Evaluation and some intervention
d. Extensive infertility treatment other than IVF
e. IVF (# of cycles)_____

Is this pregnancy a result of infertility treatment? Yes No

If yes, what treatment:_____

Health history

How would you rate your health <u>before</u> 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, <u>in the last week</u>?

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 <u>during</u> this pregnancy, <u>before the last week</u>?

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

b. 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

Was this a planned pregnancy?

a. Not planned, and not desired
b. Not planned, but once I got pregnant, desired
c. Partly…desired but not actively trying
d. Yes, planned and actively trying to get pregnant

How far along were you when you found out you were pregnant? _____ wks

How far along were you when you first saw a midwife/GP/LMC for the pregnancy?

____wks

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

c. 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.

APPENDIX I

Partner'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: _____ 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, <u>in the last week</u>?

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 partner's health during this pregnancy, before the last week?

b. 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

From your perspective, was this pregnancy… (circle one)

a. Not planned, and not desired
b. Not planned, but once she got pregnant, desired
c. Desired but not actively trying to get pregnant
d. Planned and actively trying to get pregnant

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.

APPENDIX J

In the past week, how have you felt about being pregnant?

PSAS	1 Not at all	2	3	4	5 Very much
Anxious					
Concerned					
Afraid					
Panicky					

APPENDIX K

In the past week, how have you felt about your partner being pregnant?

PSAS	1 Not at all	2	3	4	5 Very much
Anxious					
Concerned					
Afraid					
Panicky					

APPENDIX L

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	Moder ately 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				

APPENDIX M

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				

APPENDIX N

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,

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

EPDS, from the *British Journal of Psychiatry*
June, 1987, Vol. 150 by
J.L. Cox, J.M. Holden, R. Sagovsky

APPENDIX O

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:_____

_____

APPENDIX P

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 Q

Table. A

Results of Kolmogorov-Smirnov and Levene's tests of normality and homogeneity of variance

	Kolmogorov-Smirnov		Levene's
	Mothers	Partners	
PSAS	*D* (57) = 1.44*	*D* (56) = .099	*F* (1, 111) = 1.588
STAI (state)	*D* (55) = .090	*D* (54) = .137*	*F* (1, 107) = .844
STAI (trait)	*D* (55) = .104	*D* (54) = .0111	*F* (1, 107) = .379
EPDS	*D* (55) = .098	*D* (54) = .169 *	*F* (1, 107) = .112

*Significant at $p < .05$