

**Posttraumatic Stress Symptoms in Fathers of Very Low Birth Weight Infants Two to
Four Years Postpartum.**

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Abstract

The birth and hospitalisation of a very low birth weight (VLBW; <1500 grams) infant is often extremely traumatic for parents. Mothers of VLBW infants experience significantly higher rates of posttraumatic stress symptoms (PTSS) than mothers of full-term infants two to three years postpartum (Åhlund, Clarke, Hill, & Thalange, 2009). A pilot study was conducted to examine self-reported PTSS in fathers of VLBW infants two to four years postpartum compared with fathers of term infants. Results were compared with the maternal data from the study by Åhlund et al. (2009). Additional data were collected on self-reported levels of anxiety and depression in fathers. Questionnaire packs containing the Impact of Events Scale-Revised, the Patient Health Questionnaire-9 and the Generalised Anxiety Disorder Seven Item Scale were posted to fathers of infants born two to four years previously. Fathers reported on PTSS relating to the birth and hospitalisation of their infant and current anxiety and depression symptoms. Perceived levels of social support at the time of the birth of their infant were also measured. Responses were received from 26 fathers of VLBW infants and 22 fathers of term infants. PTSS levels were significantly higher in fathers of VLBW infants than those of term infants $U = 80.0, z = -4.31, p < .001$ and PTSS levels did not significantly differ between fathers and mothers $U = 222, z = -1.76, p = .079$. There was a significant association between VLBW fathers' levels of perceived social support and PTSS, but not with anxiety or depression. In conclusion, PTSS are found in fathers of VLBW infants two to four years postpartum and at similar levels to those found in mothers. Implications are discussed with particular reference to increasing psychological support for fathers following the birth of their VLBW infant and areas for further research are considered.

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Chapter One: Introduction

1.1 Chapter Overview

“The prospect of parenthood represents a milestone in anyone’s life course and is often a period of stress and challenge.” (Martin, 2012, p. xix). The transition to parenthood and the integration of an infant into the family can be experienced both positively and negatively; it is a period of both developmental change and stress (Stephenson, 1999). If a child arrives prematurely, the stress is more acute (McFadyen, 1994). There is now a myriad of literature and information regarding postpartum mental health problems in women, much of which details the changes (physically, emotionally and environmentally) that a woman goes through as she transitions into motherhood. By contrast, there is a paucity of literature examining the effect on men of becoming fathers and of the experiences of transitioning into fatherhood.

Research has demonstrated that mothers can experience post-traumatic stress disorder (PTSD) following the birth of their child (see Grekin & O’Hara, 2014). Included in the criteria for PTSD in the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5; American Psychiatric Association [APA], 2013) is the witnessing of a traumatic event. Recent research has explored that fathers could also experience PTSD as a result of witnessing the difficult birth of their child and there is some research to support this (e.g., Ayers, Wright, & Wells, 2007). Much of the research in this area focuses on post-traumatic stress symptoms (PTSS) rather than PTSD. PTSS is the sub-clinical syndrome of PTSD, where symptoms of PTSD are exhibited but full PTSD criteria are not met.

The birth of a very low birth weight (VLBW) infant (weighing <1500g) presents additional complications with the infant requiring admission to a Neonatal Intensive Care Unit (NICU). Research has suggested that some years after the birth and hospitalisation of

their child, mothers of these infants experience increased levels of PTSS compared to mothers of term infants (e.g., Åhlund, Clarke, Hill, & Thalange, 2009); the research on fathers is sparse in comparison. The current study draws upon the literature which suggests fathers have the potential to develop PTSS following witnessing the birth of their child. Additionally it draws on the literature suggesting that the birth of a VLBW infant and their subsequent hospitalisation in the NICU results in elevated PTSS levels for the parents of these infants. This study considers the effects on fathers' PTSS of both the birth and hospitalisation of their VLBW infants and aims to improve our understanding of this phenomenon.

This chapter will begin with an introduction to VLBW births, NICUs and the research on the experience of parents with babies in these units and then an introduction to PTSD and PTSS including epidemiology and aetiology. This will be followed by consideration of some of the psychological models developed to explain PTSD with attention to their applicability to the current area of research. A discussion on postnatal mental health difficulties in fathers, including PTSD, anxiety and depression will be presented. Included within this section is a brief discussion of the literature on PTSS in mothers of premature infants to consider the applicability of this knowledge to fathers. Clinical implications of the literature presented on postnatal mental health difficulties for fathers are considered, followed by why it is important to include fathers in this area of research. A rationale for the current study is given and finally the research questions for the study are presented.

1.2 VLBW Infants and the NICU

1.2.1 Definitions and prevalence.

VLBW infants will require support from a NICU due to complications arising as a result of their birth weight. Typically such complications include hypothermia, hypoglycaemia, perinatal asphyxia, respiratory problems, fluid and electrolyte imbalances, hyperbilirubinemia (the cause of jaundice), anaemia, impaired nutrition, infection, neurological problems, ophthalmologic complications, hearing deficits, and increased risk of sudden infant death syndrome (UCSF Children's Hospital, 2004). It is possible for a VLBW infant to be born at term but it is highly unlikely and therefore they are usually born prematurely. A premature birth is defined as an infant born before 37 weeks gestation. Some are born as early as 22 weeks gestation.

In 2006, the Institute of Medicine estimated that in the previous 20 years the rate of premature births had increased by more than 30% (Behrman & Butler, 2007). In 2012, 7.3% of babies were born prematurely in England and Wales and nearly 85% of these had a birth weight of under 1,000 grams (Office for National Statistics, 2014). An increased number of VLBW infants are nowadays surviving, thanks to technological advances and improved clinical care (Elklit, Hartvig, & Christiansen, 2007). However, the neonatal care and duration of hospitalisation before discharge home required for VLBW infants is inevitably much greater than that of healthy infants born at full-term (>37 weeks gestation).

1.2.2 Impact on the infant's development.

Survival without disability in a large cohort of premature infants admitted for intensive care ($N = 576$), followed-up at three-years-old, was found to be 17% for those born

at 23 weeks, 20% for infants born at 24 weeks and 24% if they were born at 25 weeks (Moore et al., 2012). Ten to 15% of VLBW children born in the UK will have major physical impairments (Cooke, 1993), and up to 40% may have learning and behavioural difficulties (Botting, Powls, Cooke, & Marlow, 1997, 1998). However, a study by Minde et al. (1989) suggested the increased behavioural difficulties noted in VLBW infants are more dependent on the nurturing received by the child than on neonatal complications. An 11 year follow-up study of 219 extremely premature infants (born at <26 weeks gestational age) found that they were at an increased risk of having a diagnosis of attention-deficit/hyperactivity disorder, emotional disorders and autism spectrum disorders (Johnson et al., 2010). Physical and emotional impairments present additional complications to parenting these children and are likely to increase the emotional burden on parents. For example, Elklit et al. (2007) found that the level of a child's handicap explained 22% of the variance in their parents' subsequent level of traumatisation following admission to the NICU. Differences in posttraumatic stress responses related to infant perinatal risk factors have been found in mothers and fathers, Gamba Szijarto et al. (2009) found perinatal risk factors played a greater role in PTSD symptoms of fathers compared with mothers where infant prematurity played a greater role. Rautava, Lehtonen, Helenius, and Sillanpaa (2003) found fathers to be more affected by the critical illness of their infant than mothers, with fathers needing more help and support in the first year. These findings suggest that the impact of infant prematurity and perinatal risk factors may be different for mothers and fathers and may have implications for considering potential risk factors for developing postpartum PTSS.

1.2.3 The experience of parents in the NICU.

Standard antenatal care for parents does not prepare them for the stressful event of giving birth to a premature infant nor the difficult and often extremely traumatic experiences

of parents whilst the baby is cared for in the NICU. Lindberg, Axelsson, and Ohrling (2008) argue that parents lack psychological, emotional and physical readiness for a premature birth. Furthermore, NICU nursing and medical staff are not specifically trained to help these parents psychologically, nor do they have the time needed for provision of the acute or ongoing psychological support many parents require (Alam, Åhlund, Thalange, & Clarke, 2010). This lack of preparation increases the risk of the development of postnatal mental health difficulties in parents of these children (Whittingham, Boyd, Sanders, & Colditz, 2014). Spielman and Taubman-Ben-Ari (2009) note that pregnancy allows for an emotional maturation and preparation for pregnancy, a process cut short in premature births (Spencer & Edwards, 2001).

The NICU itself is a very unusual environment for parents, with a number of alien sights and sounds; it is a difficult setting for parents that is unfamiliar, intimidating and public (Fegran, Helseth, & Fagermoen, 2008). Lefkowitz, Baxt, and Evans (2010) noted a number of different factors which could contribute to the general distress of parents of infants in the NICU including: the appearance and behaviour of a sick infant, the use of complex medical language and technology, threat of potential loss of their child's life, and parents' loss of their role in their infant's care. It can be further emotionally challenging due to the possibility of learning about the death of another infant whilst in the unit (Elklit et al., 2007). Feelings of lack of control and helplessness regarding the care of their child are likely to be prevalent (Arockiasamy, Holsti, & Albersheim, 2008). Lack of control has been linked to the development of PTSD in the NICU environment (Reid & Bramwell, 2003). Additionally parents may find it difficult to respond to the often incomprehensible signals of their infants, further contributing to their distress (Mehler et al., 2014; Muller-Nix et al., 2004) and potentially impacting on attachment (see section 1.2.4). All the above factors add to the

challenging environment of the NICU and increases the emotional distress that may occur as a result. Parents are likely to find themselves in a state of high stress which may prevent them from being able to process events occurring whilst their child is in the NICU.

Difficulties in processing traumatic events is linked to the development of PTSD (see section 1.4 for further discussion).

Recently research has increasingly investigated fathers' experiences in the neonatal unit, an area previously overlooked (Hugill, 2014). Research has suggested that fathers find having their infant cared for in a neonatal unit emotionally challenging (Hugill, Letherby, Reid, & Lavender, 2013; Lee, Miles, & Holditch-Davis, 2006). Hollywood and Hollywood (2011) found fathers experienced anxiety, feelings of helplessness and a fear of the unknown whilst their premature baby was in the NICU. Joseph, Mackley, Davis, Spear, and Locke (2007) investigated stress in fathers of surgical NICU babies and found significant stress inducing factors to the fathers were: being unable to protect their baby from pain, being separated from their baby, seeing the baby in pain, being unable to comfort and help their baby and breathing problems in their baby.

1.2.4 Attachment in the NICU.

Attachment is an enduring emotional bond formed by an individual to another person (Bowlby, 1977). Infants' development of secure attachments to their caregivers contributes to their emotional competence. Such attachments are dependent on parents' being attuned and responsive to the signals of their infant's needs (Carr, 2006). The establishment of infants' attachment styles through interaction with their parents shapes their social relationship patterns later in life and can influence psychological health (Sroufe, Carlson, Levy, & Egeland, 1999; van IJzendoorn, 1995; Winnicott, 1956). When considering

attachment behaviours, it is common to think about the attachment to the mother as the primary caregiver as being the most important, however, Schaffer and Emerson (1964) found infants often formed multiple attachments and in some cases the strongest attachment was to the father. Additionally, Howe (2011) notes that although the role of mothers tends to be critical, actively involved fathers also have long-term effects. He notes that key attachment figures influence core personality characteristics. The way fathers play and interact with children as toddlers has a long-term impact on children's future emotional development (Grossmann et al., 2002).

Having an infant in the NICU may delay parental attachment (Sullivan, 1999) with the extended separation caused by hospital admission affecting normal attachment development (Feldman, Weller, Leckman, Kuint, & Eidelman, 1999). The technology that is necessary in the NICU has the effect of preventing physical contact between a parent and their child. There are a number of factors specific to premature infants which may affect the development of the parent-infant relationship, for example, premature infants can be simultaneously more irritable, more passive and less responsive (McFadyen, 1994). Minde, Whitelaw, Brown, and Fitzhardinge (1983) found a number of factors to influence the parent-infant interaction with premature infants in the postnatal period: parents' perception of how sick their infant is, actual morbidity and duration of illness. Spontaneous activity of these babies is limited by the machinery that surrounds them to support them to survive and developing relationships are influenced by parental perceptions of their child's capabilities (McFadyen, 1994). These effects can be long lasting, for example, a study by Kratochvil, Robertson, and Kyle (1991) found eight years after birth 36% of parents of VLBW infants felt their relationship with their infant had been affected as a result of neonatal intensive care.

The father-infant relationship may further be interrupted by the lack of knowledge about a newborn's behaviour which undermines fathers' confidence (Discenza, 2010; Zelkowitz, Bardin, & Papageorgiou, 2007). However, Brown, Rustia, and Schappert (1991) found fathers of high risk infants become involved with care giving at an earlier stage than those of healthy infants. Fathers performed significantly more infant care ($p < 0.005$) when questionnaires were administered at one month post-discharge, though, at three months post-discharge there was no difference between the two groups of fathers. This latter research would suggest that NICU hospitalisation may positively impact the early period of father-infant attachment compared to fathers of term infants. Support for this comes from a qualitative study of fathers with preterm infants admitted to the NICU where fathers suggested they had a stronger bond with their infant compared with friends who had infants born at term (Lindberg et al., 2008).

Having a premature infant may also affect the type of parent-infant attachment. In one study, 20% of mothers of premature infants had secure attachment representations compare to 53% of mothers of term infants at six months (corrected for prematurity); differences were maintained at 18 months, and thus suggests premature birth affects mothers' attachment representations (Borghini et al., 2006). Although this study did invite fathers to participate, the lack of fathers agreeing to resulted in the analysis only being conducted on mothers and there is a lack of research looking at the effect on attachment type with fathers. Borghini et al. (2006) found a large difference in the participation rates of the preterm (78%) and full-term (38%) groups which may have impacted results as there may be a bias in the type of attachments parents had in the term group who agreed to participate. This research highlights the potential for NICU admission to affect father-infant attachment but further research is required to further understand these impacts.

1.2.5 The role of the father in the NICU and their experience.

In addition to the impact on parents' emotional wellbeing, the milieu of the NICU has also been shown to have an effect on parental roles. Hollywood and Hollywood (2011) showed that fathers reported a number of differences between the paternal and maternal role whilst in the NICU, which they felt was compounded by staff attitudes towards fathers. McFadyen (1994) noted that fathers frequently free the mother to attend emotionally to the baby in the NICU by taking on the roles of breadwinner and carer for siblings. Many fathers visit their infant in the NICU less frequently and for shorter durations of time than mothers do (e.g., Franck & Spencer, 2003; Garten, Maass, Schmalisch, & Bühner, 2011; Latva, Lehtonen, Salmelin, & Tamminen, 2007). This may be as a result of their need to balance employment demands, support family life and be present in the neonatal unit (Hugill et al., 2013; Lindberg et al., 2008). This could mean that fathers experience less exposure to the traumatic sights in the NICU and thus perhaps reduce their risk of the development of subsequent psychological difficulties.

Tannen (1991) found that men generally find it harder than women to disclose their emotions. However, research has suggested that fathers in the NICU may censor their own emotions in order to protect their partner (Harvey & Pattison, 2012; Hugill et al., 2013; Lee et al., 2006) or "to 'hold' the family together and 'fix' things" (Discenza, 2010). Whether fathers find it hard to disclose emotions or purposely censor them, their emotional needs may be unapparent to partners, family and hospital staff and their emotional needs may be unknown. Avoidance is a key component of PTSD and may lead to increased risks for its development.

1.2.6 The role of social support in the NICU.

The absence of a social network contributes to and predicts emotional reactions after birth (Callahan & Borja, 2008). Social support has been shown to be a predictor of maternal distress and to impact upon mental health in mothers of preterm infants (Jones, Rowe, & Becker, 2009; Weiss & Chen, 2002). Specifically, support from family and friends has been shown to reduce the risk of postpartum depression in both mothers and fathers (Areias, Kumar, Barros, & Figueiredo, 1996; Deater-Deckard, Pickering, Dunn, Golding, & Team, 1998). However, Elklit et al. (2007) found lack of social support did not directly predict the development of PTSD in parents of VLBW infants, but the presence of it was an important factor that parents found extremely positive and meaningful. Ghorbani, Dolatian, Shams, and Alavi-Majd (2014) found a significant difference ($p = .01$) in the perceived levels of social support for fathers of term and premature infants, with the latter having higher levels than the former. This could be as a result of fathers of premature infants coming into contact with hospital staff to a greater degree for longer periods of time, a support network less available to fathers of term infants. Social support could be provided by partners/spouses, friends, family and hospital staff. Other studies have found no difference in perceived levels of social support between preterm and term fathers (Mehler et al., 2014); these differences could be as a result of this study investigating fathers of moderate to late preterm infants (born at 32 to 37 weeks) which may have greater similarity to full-term infants. The study by Ghorbani et al. (2014) did not specify what gestational age their preterm infants were so it is not possible to make distinct comparisons. Deeney, Lohan, Parkes, and Spence (2009) noted that providing counsel to fathers and families whilst their baby is on the unit and preparing them for discharge home is a “major part” of the nursing role. Garten, Nazary, Metze, and Bühner (2013) found that fathers value the support provided by staff at the cot side. However, this

support may not always be available; Parfitt and Ayers (2012) found that several fathers felt left out by professionals in terms of support in their qualitative study of 85 first-time parents (40 of whom were fathers).

1.3 PTSD

1.3.1 Definitions and diagnosis.

The fifth edition of the DSM (DSM-5; APA, 2013) has resulted in a change to the definition of PTSD. In the DSM-5 PTSD is no longer categorised as an anxiety disorder but instead as a “trauma and stressor-related disorder”; this category also includes acute stress disorder, adjustment disorders, and other related diagnoses. The diagnostic criteria stated in DSM-5 identify that the trigger to PTSD is exposure to or actual threatened death, serious injury or sexual violation. This exposure must result from one or more of the following scenarios:

- direct experience of the traumatic event;
- witnessing the traumatic event in person;
- learning that the traumatic event occurred to a close family member or close friend (with the actual or threatened death being either violent or accidental);
- experiencing first-hand repeated or extreme exposure to aversive details of the traumatic event (not through media, pictures, television or movies unless work-related).

Regardless of the trigger, to meet criteria for a PTSD diagnosis DSM-5 states that the individual must experience significant distress or impairment in their social interactions, capacity to work or other important areas of functioning. These symptoms must not be as a result of another medical condition, medication, drugs or alcohol. Any symptoms present need to have started or worsened after the traumatic event(s) and the disturbance needs to

have continued for more than a month. The symptoms of PTSD can be categorised into four distinct diagnostic clusters: re-experiencing, avoidance, negative cognitions and mood, and arousal and reactivity. The cluster of negative cognitions and mood is additional to that proposed in DSM-IV-TR (Diagnostic and Statistical Manual-Fourth Edition Revised; APA, 2000). Re-experiencing involves intrusive memories of the traumatic event, recurrent dreams related to it and flashbacks. Avoidance includes the adoption of activities or behaviours to avoid reminders of the traumatic event. Negative cognitions and mood includes many different feelings, from a persistent and distorted sense of blame of self or others, to the inability to recall key aspects of the trauma, to diminished interest in activities or detachment from others. Lastly, arousal refers to persistent feelings of over-arousal which could manifest itself in aggressive, reckless or self-destructive behaviour, sleep disturbance or hyper-vigilance.

Another significant change between DSM-IV-TR and DSM-5 (APA, 2013) is that the criterion that an individual must have responded to the traumatic event with “intense fear helplessness or horror” has been removed due to its lack of utility in predicting the onset of PTSD. Despite these changes, Gillihan, Cahill, and Foa (2014) suggest that current theories of PTSD are unlikely to need large adjustments as the revisions in DSM reflect the current theories of the disorder, additionally 16 of the 17 symptoms of PTSD in DSM-IV-TR (APA, 2000) were retained in DSM-5 (APA, 2013). However, as DSM-5 is a recent edition the current available literature on PTSD is based on DSM-IV (APA, 1994) and DSM-IV-TR (APA, 2000) criteria, including the measures used to assess PTSD symptoms and the models developed to explain the disorder. The literature awaits new research into assessing whether any of the current theoretical understandings of PTSD need to be altered in line with these

changes. The remainder of this chapter will therefore discuss research in relation to the DSM-IV and DSM-IV-TR (APA, 1994, 2000) criteria for PTSD unless otherwise stated.

1.3.1.1 Applying the definition and diagnosis to postnatal PTSD.

Beck (2004) argued that childbirth can qualify as a traumatic event. The DSM-5 (APA, 2013) criteria of “witnessing the event in person” and “learning that the traumatic event occurred to a close family member or close friend” can specifically relate to fathers witnessing the birth of their child and subsequent admission to the NICU. Briere and Scott (2013) suggest that an event should be considered traumatic if the individual finds it extremely upsetting and it “at least temporarily overwhelms the individual’s internal resources” (p.8). Given this definition, the birth of a child and subsequent admission to the NICU could be considered a traumatic event. Men attending childbirth may experience many hours of significant arousal along with vivid images of a life-threatening situation for their partner and baby (Bradley, Slade, & Leviston, 2008).

McKenzie-McHarg et al. (2015) suggest that the culturally positive connotations of childbirth have implications for labelling and measuring postnatal PTSD in mothers and comparing this group with other populations of PTSD sufferers. These implications are equally applicable when considering postnatal PTSD in fathers. Ayers, McKenzie-Mcharg, and Eagle (2007) suggest childbirth is qualitatively different from other traumatic stressors for women due to a simultaneous positive perception of the birth of their child and a traumatic appraisal of the labour. However, this may be different for the birth of a VLBW infant where an overwhelming sense of fear may prevail for a long time after the traumatic event of the labour and birth itself, with parents fearing for what the outcome for their infant will be. Support for this is provided by Lundqvist, Westas, and Hallström (2007) who found

fathers live with a sense of worry, both with respect to an immediate sense of threat regarding their preterm infant's chances of survival and concern for their partner.

1.3.2 Epidemiology and aetiology.

Approximately 8.7% of the population will at some point in their lifetime experience PTSD (Kessler et al., 2005). The National Comorbidity Survey conducted in 1995 found women were twice as likely to experience PTSD in their lifetime as men (10% versus 5%; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Kilpatrick, Resnick, Milanak, Miller, and Friedman (2013) recruited 3,000 US adults to examine how the DSM-5 (APA, 2013) criteria influenced the estimate of exposure to potentially traumatic events. They found that 97.5% of those meeting DSM-IV (APA, 1994) criteria also met DSM-5 (APA, 2013) criteria, indicating little effect of the criteria changes in diagnosis levels. Women are significantly more likely to develop PTSD following being exposed to a traumatic event than men (Fullerton et al., 2001; Holbrook, Hoyt, Stein, & Sieber, 2002). Yehuda (2002) notes that the literature is not clear as to whether women have an increased vulnerability to PTSD or whether it is as a result of similar events being experienced differently by the genders.

Approximately 50% of adults experience at least one event in their lifetime which has the potential to cause PTSD symptoms (Ozer & Weiss, 2004). The reasons that some people develop symptoms and others do not is as a result of psychological or biological vulnerability factors, or individual differences in coping strategies. In terms of vulnerability factors, there have been a number identified which may make an individual more likely to develop PTSD, these include: a family history of PTSD (Foy, Resnick, Sippelle, & Carroll, 1987), developmental factors such as an unstable family life during childhood (King, King, Foy, & Gudanski, 1996), and existing high levels of anxiety or pre-existing psychological disorder

(Breslau, Davis, Andreski, Peterson, & Schultz, 1997). All of these factors will affect the individual coping strategies employed to manage PTSD. A meta-analysis of the risk factors for PTSD by Brewin, Andrews, and Valentine (2000) suggests that some risk factors (e.g. gender and race) predicted PTSD only in some populations, other factors predicted more consistently but to varying degrees across populations (e.g. previous trauma), but factors such as psychiatric history, childhood abuse and family psychiatric history had more uniform predictive effects. The degree of controllability, predictability and perceived threat of the traumatic experience are contributory factors to the intensity of the posttraumatic response (Foa, Zinbarg, & Rothbaum, 1992). The theories to explain the development and maintenance of PTSD will be explored in section 1.4.

1.3.3 Definition of PTSS.

A number of people who experience trauma develop some, but not all symptoms of PTSD. The presence of these symptoms when full criteria for PTSD are not met is usually referred to as PTSS. PTSS can be experienced even if individuals have not appraised the event to have been traumatic (Soet, Brack, & Diiorio, 2003). Kazak et al. (2006) noted that the concept of PTSS has proved useful in the paediatric literature; the symptoms are more broadly applicable to patients and families than psychiatric diagnoses. The use of measuring PTSS rather than PTSD in the existing literature suggests that this would be appropriate to consider for the current piece of research.

1.3.4 PTSD and co-morbidity.

Approximately 80% of patients with PTSD have at least one comorbid psychiatric disorder, commonly depression and anxiety disorders (Grinage, 2003). Kessler et al. (1995) found that individuals exposed to traumatic events are at an increased risk for major

depression, panic disorder, generalised anxiety disorder, and substance misuse, compared to those individuals not exposed to such events. Mothers who experienced intrusive symptoms of PTSD six to 18 months after their infant's birth were more likely to report symptoms of depression (Affleck, Tennen, & Rowe, 1991). In a similar way that measures of PTSS are often used rather than measures of PTSD in the research literature, co-morbid conditions such as depression and anxiety are often assessed using screening measures rather than diagnostic tools. Screening measures for these conditions will therefore be appropriate to consider in the current piece of research.

There are symptoms which are common to both individuals suffering with depression and those with PTSD. Biased enhanced recall of trauma related material and the retrieval of certain autobiographical memories can be observed in both conditions (Buckley, Blanchard, & Neill, 2000). Increased negative beliefs about the self, others and the world can be present in trauma victims with PTSD (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999) and in individuals with depression (Beck, Rush, Shaw, & Emery, 1979). Yehuda (2002) suggests that the substantial overlap of symptoms of PTSD and depression and anxiety disorders, in addition to the presence of non-specific physical symptoms (e.g., heart palpitations), means a PTSD diagnosis can easily be missed. This is compounded by practitioners' reluctance to ask patients about traumatic events and patients are unlikely to discuss these topics without prompting. She argues for the need for practitioners to break down this important barrier and legitimise the event as a valid explanation for symptoms: this is likely to be particularly pertinent to the perception of childbirth as traumatic for some parents.

1.4 Psychological Models of PTSD

This section describes two psychological models explaining the development and maintenance of PTSD: a cognitive and an integrative model. Gillihan et al. (2014) argue that

a theory of PTSD needs to account for two things: the psychopathology of PTSD (including both natural recovery and its chronic development) and how treatment reduces PTSD symptoms. There have been a variety of psychological models proposed to address these issues, of which the cognitive and integrative models are two.

1.4.1 A cognitive model of PTSD.

Ehlers and Clark (2000) proposed a cognitive model which states that PTSD is developed and maintained through a combination of the nature of the trauma memory and negative appraisals of the trauma. Maladaptive appraisals cause difficulties integrating the trauma memory with other memories, leading to an ongoing sense of threat, activating symptoms of PTSD (including intrusions, re-experiencing and arousal). Strategies developed to manage symptoms conversely continue to maintain them, i.e. thought suppression, hypervigilance, trauma reminder avoidance, rumination and dissociation. These coping strategies have been observed in fathers of VLBW infants and infants admitted to the NICU. For example, Arockiasamy et al. (2008) found that fathers reported a “hyper-vigilance response” of carefully monitoring the actions of the NICU staff and Elklit et al. (2007) found parents of VLBW infants to employ thought suppression and/or avoidance strategies. The cognitive model (Ehlers & Clark, 2000) could therefore be helpful in explaining PTSS in fathers following the birth of their child. Figure 1 provides an illustration of this model.

Ehlers and Clark (2000) note that the model is able to explain a number of the clinical features of PTSD, including anniversary reactions, the experience of being “frozen in time”, a sense of impending doom and the lack of benefit gained from talking/thinking about the trauma. However, the model gives considerable focus to the cognitive processes involved in PTSD with limited discussion of how these interact with elements of an individual’s

environment and personality. Additionally Gillihan et al. (2014) note that research has shown the addition of cognitive therapy to exposure treatment fails to enhance treatment efficacy, which suggests that although the cognitive processes may help to explain the development and maintenance of the disorder, they may not be able to be successfully utilised in the treatment of the disorder.

Gillihan et al. (2014) point to the innovative explanation in the cognitive model of the reciprocal relationship between the nature of the trauma memory and the appraisal of the trauma and its sequelae. Ehlers and Clark (2000) propose that the recall of the traumatic event is biased by the individual's appraisals and they will selectively recall appraisal consistent information. This selective recall prevents any appraisal contradicting aspects of the event and so prevents change in the appraisals, thus creating the vicious cycle which promotes a sense of current threat maintaining the PTSD symptoms. Therefore the model is useful in explaining how PTSD may develop and be maintained and this could be applied to fathers who have experienced the birth and hospitalisation of their infant as traumatic. Fathers may selectively recall information about the event that is consistent with an appraisal that they had a lack of control. This has been shown to be experienced by fathers of VLBW infants (Elklit et al., 2007).

Ehlers and Clark (2000) suggest their model can explain the phenomenon of delayed onset of PTSD, that some individuals report no or few symptoms in the initial time period following the traumatic event. Research has suggested that fathers may experience a delayed onset of PTSD following the birth of their child (e.g. Shaw et al., 2009). The model explains this delayed onset with the assumption that either a later event gives the original trauma or its sequelae a more threatening meaning or, alternatively some of the reminder stimuli of the event are not available until sometime after it has occurred. For example, fathers of VLBW

infants may change the meaning of their child's birth and hospitalisation or be exposed to potent reminders at a time when they are having another child or close friends/family members are having children. Alternatively, constant reminders can be provided by a child's

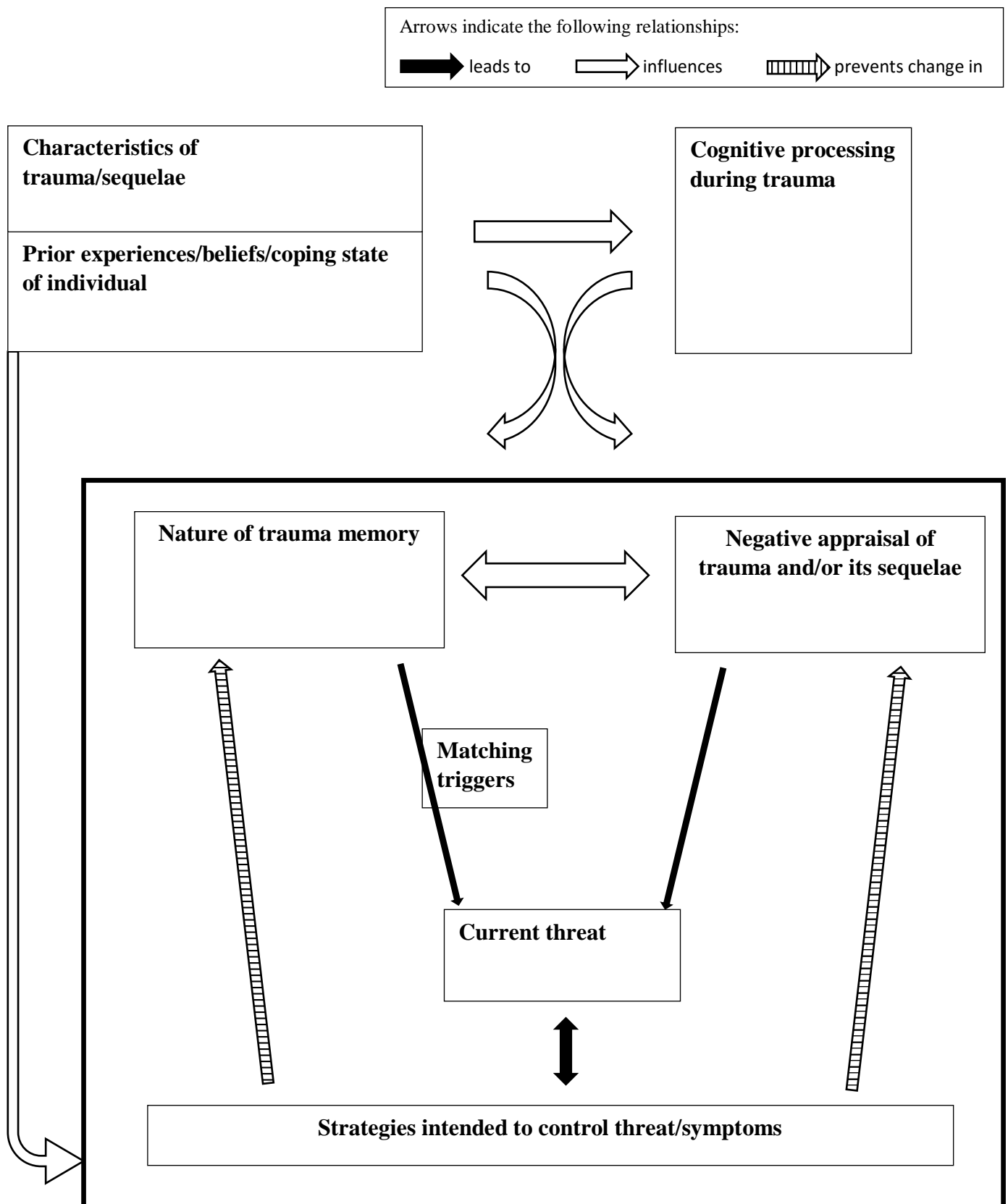


Figure 1. Cognitive Model of PTSD (Ehlers & Clark, 2000)

disability which may have occurred as the result of being of VLBW and could explain why the level of handicap has been shown to predict traumatising (Elklit et al., 2007).

Barry and Singer (2001) suggested infants' disabilities can act as reminder triggers for mothers' feelings of helplessness and anxiety experienced in the NICU.

1.4.2 An integrative psychosocial model of PTSD.

Ehlers and Clark (2000) focused on the cognitive procedures involved in the development and treatment of PTSD though do not give much focus to the role of emotions in PTSD. However, emotion is likely to be an important aspect when considering the reaction of fathers following the birth of their VLBW infant, for example, fear of their partner dying has been shown to be common (Hanson, Hunter, Bormann, & Sobo, 2009). Joseph, Williams, and Yule (1997) argued that models of PTSD are only partially successful in understanding posttraumatic stress reactions and that an integrative approach is needed to explain the full range of reactions experienced by sufferers. They proposed a model of PTSD including both the immediate cognitive processes and consideration of a wider set of factors involved in developing and maintaining the disorder. The model therefore considers the influence of both the nature of the trauma and of the individual, incorporating both schema and cognitive theories as well as considering the impact of the emotional processing of an individual.

The integrative psychosocial model proposes that representations of a traumatic event create an *event stimuli*. This information produces extreme emotional arousal at the time of the event and affects the immediate processing of it. The memory of the event stimuli forms the basis for re-experiencing intrusive symptoms. It is held in *event cognitions*, which can be either consciously or unconsciously retrieved and are affected by an individual's schemas of

the world. Prospective fathers will have a schema of what this role entails and how their world will be when their new infant enters it. Additionally, they will have prior beliefs about labour and the birth. It is conceivable to see how the labour and birth could not match these schemata (whether or not they were particularly traumatic) and the birth of a VLBW infant is unlikely to be what is expected.

Event cognitions are then further subjected to cognitive activity by *appraisal mechanisms*, which are more consciously influenced by an individual's schemas and/or aspects of their personality and can take the form of automatic thoughts or ruminative processes. The content of the appraisal mechanisms influence *emotional states*: they can both impede or promote emotional processing. These emotional states can in turn be the subject of cognitive appraisal, influenced by personality and thus creating a two-way process meaning emotional states can generate further emotional states (e.g. shame about fear). Fathers have reported a feeling of loss of emotional control on first meeting their premature infant (Hugill et al., 2013) which could lead to the generation of further emotional states. Event cognitions, appraisals and emotional states lead to distress which an individual attempts to manage using *coping mechanisms*, often avoidance strategies. For example, in fathers of VLBW and extremely low birth weight infants, detached coping mechanisms were used significantly more than they were by mothers (Elklit et al., 2007). The *environment and social context* impacts on the ability to cope, by influencing meaning attributions, emotional states, memory structures and coping via the appraisal mechanisms. This appraisal mechanism means the environment and social context can either be helpful or could potentially induce further distress. Figure 2 provides an illustration of this model.

Joseph et al. (1997) states that an individual experiences repetitive cycles of intrusions, appraisals, associated emotional reappraisals and coping which results in further

intrusive cognitions. This cycle feeds back into memory representations until mental models are adjusted to process the event. In those with PTSD the mental models are not adjusted, thus the event cognitions continue to act as event stimuli post-event period. Research by Affleck et al. (1991) suggests parents have persistent memories following their baby's discharge from the hospital which they attribute to why they feel more distressed at discharge and this may represent a continuing attempt at mastery and to adjust their mental models.

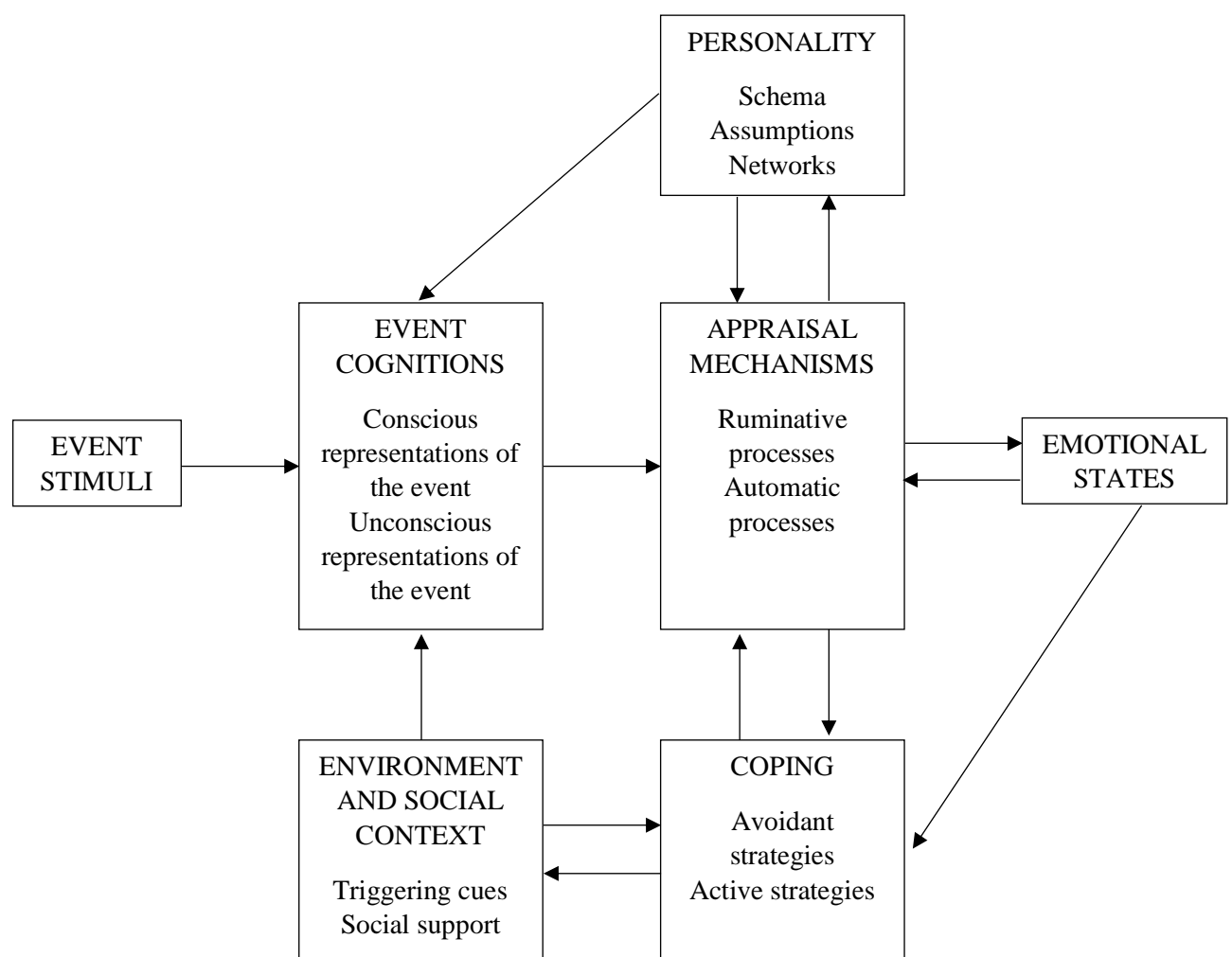


Figure 2. Integrative Psychosocial Model of PTSD (Joseph et al., 1997).

1.4.3 Summary of models.

In summary, the two models described in this section assist in understanding the mechanisms of how PTSD is developed and maintained. The cognitive model of Ehlers and Clark (2000) however, fails to account fully for both emotional aspects and the role of social support which are likely to be important in the development of PTSS in fathers of VLBW infants. The integrative model proposed by Joseph et al. (1997) has advantages in understanding postnatal PTSD in fathers in that it is able to consider the role of these elements.

1.5 Postnatal Mental Health in Fathers

The following section will explore the literature on postnatal mental health difficulties in fathers. Bradley and Slade (2011) conducted a review of mental health problems in fathers. Problems identified were depression, anxiety, obsessive-compulsive disorder (OCD), stress/PTSD, bipolar disorder and psychosis. They called for more research specifically on men's experiences of anxiety, OCD, PTSD, bipolar disorder and psychosis in terms of prevalence and predictors. Some discussion of the literature on postnatal mental health problems in mothers will also be explored due to the limited nature of the research on fathers, whereas postpartum mental health problems in women are well-documented in the literature (see Brockington, 1996). The literature on postpartum mental health problems in mothers could inform the research into fathers.

Postnatal psychological distress in men may be related to attending the birth (Bradley et al., 2008). There is a cultural expectation that fathers should attend the birth of their child (Chan & Paterson-Brown, 2002; Longworth, 2006) with 97% expressing a desire to be present (Hollins Martin, 2008). However, there is a recognition that attending the birth can cause stress regardless of the type of birth and it has been found that more than 80% of men

have some fears regarding attendance (Szeverényi, Póka, Hetey, & Török, 1998). Only 12 % of men, in a retrospective survey of 100 men two years postpartum, described an overall positive experience of the birth (Barclay, Donovan, & Genovese, 1996). Concerns about attending the birth have been connected to depression in the pre- and postnatal periods (Gawlik et al., 2014). Hollins Martin (2012) argues for fathers to have choice about whether to participate during childbirth or not, to ensure they have satisfactory psychological outcomes in the perinatal period. She also argues for the use of routine enquiries regarding the psychological state of the father in the days and weeks following the birth, in order to establish the incidence of the mental health disequilibrium experienced by men after birth. Fathers of premature infants have the additional psychological distress as a result of becoming premature parents (Spencer & Edwards, 2001).

1.5.1 Postnatal PTSD and PTSS.

Postnatal PTSD in mothers has been reported to have a prevalence rate of 3.1%, rising to 15.7% in high-risk groups (Grekin & O'Hara, 2014). PTSS has been found to be higher in mothers of high-risk infants (being born prematurely, of VLBW or being born at term but medically fragile and needing NICU admission) than mothers of healthy full-term infants (e.g., Callahan & Hynan, 2002; Åhlund et al., 2009). Similar research in fathers is lacking. The existing findings will be discussed in detail in section 1.5.3.

1.5.2 Postnatal PTSS in mothers of VLBW infants.

Mothers of VLBW infants have been shown to experience significantly higher rates of PTSS compared to a control group of mothers of term infants (e.g. Kersting et al., 2004; Ghorbani et al., 2014; Pierrehumbert, Nicole, Muller-Nix, Forcada-Guex, & Ansermet, 2003; Åhlund et al., 2009). Åhlund et al. (2009) found that PTSS in mothers of VLBW infants

were present beyond the neonatal period: 17% experienced symptoms indicating probable PTSD diagnosis two to three years postpartum. Only 8% scored “low” on the Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997), i.e. scores < 6, whereas all the control mothers scored in this category. Prior to this study very few studies had followed up PTSS in mothers of VLBW infants beyond infancy. The study had a low response rate, but did have a good effect size of 0.79. Their findings were consistent with other research which has shown mothers of premature infants to experience significantly higher levels of depression, anxiety and PTSS than mothers of full-term infants (DeMier, Hynan, Harris, & Manniello, 1996; Holditch-Davis, Bartlett, Blickman, & Miles, 2003; Jotzo & Poets, 2005; Kersting et al., 2004; Pierrehumbert et al., 2003; Singer et al., 1999).

Åhlund et al. (2009) noted limitations of their study including the low response rate and only assessing symptoms at one time point, therefore meaning they were unable to ascertain the development of symptoms over time. Åhlund et al. argue that their results suggest that the enduring distress experienced by the mothers in their sample was as a result of having a VLBW infant. They considered that the higher prevalence of chronic health impairment and neurodevelopmental problems resulting in the need for long-term hospital follow-up may serve as frequent painful reminders of the birth and hospitalisation of their infant. These may therefore be important factors in the development of PTSS in mothers of VLBW infants. Despite this conclusion, there is no evidence that mothers did indeed complete the questionnaire considering current symptoms in relation to the birth of their child as instructed. The study did not contain a formal measure of anxiety or depression, nor did it take account of other risk factors such as past or on-going medical and psychiatric problems and socio-economic factors.

1.5.3 Postnatal PTSD in fathers.

To date there has been only limited research conducted into postnatal PTSD in fathers. Consideration of PTSD reactions in fathers whose babies died have been excluded from this discussion due to the different nature of this event. The studies will be discussed separately to focus on those assessing postnatal PTSD in fathers of: healthy/term infants, infants where the birth was traumatic, and infants who were admitted to the NICU. Two recent studies recruited participants prior to the birth of their first child and thus cannot be categorised in the above sections. Parfitt and Ayers (2014) found 5% of their sample of 48 fathers met PTSD criteria at five months postpartum. Whereas Zerach and Magal (2016) found 2% of their 171 Israeli fathers met criteria for PTSS at one month postpartum.

1.5.3.1 Postnatal PTSD in fathers of healthy/term infants.

In one study approximately 5% of fathers had clinically significant symptoms of PTSD at nine weeks postpartum which was associated with complications of delivery and emotions during birth (Ayers et al., 2007). Similarly nearly 5% of fathers witnessing the birth's final stages had scores indicating high distress at 48 hours and six weeks postpartum; it was unclear if these scores met clinical diagnostic criteria (Johnson, 2002). However, in contrast Skari et al. (2002) and Bradley et al. (2008) found no fathers reported symptoms likely to be consistent with a diagnosis of PTSD. In the study by Bradley et al. (2008) 11.6% did report clinically significant symptoms on the Posttraumatic Stress Disorder Questionnaire (Czarnocka & Slade, 2000) and 4.1% reported clinically significant scores on at least one dimension on the Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979) at six weeks postpartum. Skari et al. (2002) found 11% of fathers experienced psychological distress at six months postpartum. Despite the differences in the results obtained in these studies, all indicated that there is the potential for fathers to experience some symptoms of

PTSD in relation to the birth of their child. Differences in the findings may be due to when measures were taken as this varied across the studies. Samples in these studies were large, however, retention rates were generally poor. For example, Bradley et al. (2008) had a 58.5% retention rate to follow-up and they noted differences between responders and non-responders, which suggests a self-selecting bias in the sample. In contrast, Skari et al. (2002) had 122 fathers consent to take part (93% of those approached) with 81% completing all measures.

There are some inconsistencies in the literature as to what researchers have classified as a healthy/term birth: studies by Bradley et al. (2008) and Skari et al. (2002) specified only that the infants were “healthy” and born at term whereas the study by Johnson (2002) specified that the infants were full-term, singletons and had unassisted delivery. Bradley et al. (2008) included fathers of infants who required support in a Special Care Baby Unit for less than 12 hours whereas Ayers et al. (2007), Johnson (2002) and Skari et al. (2002) excluded these. Ayers et al. (2007) did not have any exclusion criteria related to delivery and a number of the fathers’ partners had birth complications or required assisted or Caesarean delivery, which may have inflated the post-traumatic responses observed. Conversely Johnson (2002) excluded these fathers. Differences in inclusion and exclusion criteria possibly impacted on differences in the results of these studies making it difficult to draw conclusions as to the potential impact of birth experience on the results.

1.5.3.2 Postnatal PTSD in fathers of infants where the birth was traumatic.

The two studies identified in this category, Parfitt and Ayers (2009) and White (2007), defined a traumatic birth according to the fathers’ perceptions (i.e. they perceived it as a traumatic event). Research on families of children in paediatric intensive care has suggested that subjective experience is more important than the objective nature of the child’s

illness in predicting psychological outcome (Colville & Pierce, 2012). Binder, Zeltzer, Simmons, Mirocha, and Pandya (2011) also suggested that the development of posttraumatic symptomatology in parents following their child's admission to the NICU is dependent on their subjective perception of the event. Parfitt and Ayers (2009) found that 11.5% of the fathers met criteria for PTSD as assessed by the Posttraumatic Stress Diagnostic Scale (Foa, 1995). White (2007) conducted a qualitative study in which all the fathers they interviewed described distress but not all described symptoms of PTSD. The fathers they interviewed varied greatly in the amount of time it had been since their child had been born, from two weeks to 30 years. This varying timescale suggests that symptoms of distress associated with the birth of a child can persist long beyond the perinatal period for fathers.

In critique of these studies, both used internet and media recruitment targeting associations to support parents of infants with traumatic births. The purposive nature of the sampling makes it difficult to generalise the findings. Both samples were small, which is to be expected in qualitative research but the study by Parfitt and Ayers (2009) was only powered to detect large effect sizes. However, the authors noted that the sample was broadly representative of the UK childbearing population in terms of participant characteristics, supporting generalisability. Despite the limitations of both studies, the findings suggest a potential for fathers to develop PTSS following a traumatic birth.

1.5.3.3 Postnatal PTSD in fathers of infants who were admitted to the NICU.

These studies included fathers whose infants were admitted to the NICU following birth, typically due to prematurity and/or severe medical illness. A review by Karatzias, Chouliara, Maxton, Freer, and Power (2007) looked at the literature on PTSD in parents of premature infants, which highlighted the paucity of studies into PTSD for parents of this group of infants. Their search resulted in five studies in the area with only one considering

fathers (Pierrehumbert et al., 2003) which found the intensity of parents' PTSS in response to premature birth was an important predictor of sleeping and eating problems in their children at 18 months old. As well as the need for more research on fathers, Karatzias et al. (2007) made recommendations that future research should include longer-term follow-up assessments and include data on infant factors.

One study (Elklit et al., 2007) has specifically looked at fathers of VLBW infants and this found no fathers to meet criteria for PTSD diagnosis. However other studies indicated the presence of PTSD. Binder et al. (2011) found prevalence rates of clinically significant PTSD remained at 25% at seven days and a month postpartum, then reduced to 15% at two months and 10% at six months. In contrast another sample found 1.2% met criteria for PTSD diagnosis at two months postpartum (Ghorbani et al., 2014). In other samples, 8% met criteria at 30 days postpartum (Lefkowitz et al., 2010), and 33% at four months, with 67% being "at risk" (Shaw et al., 2009). A study of fathers of moderate to late preterm infants (those born between 32 and 37 weeks) found 2% met criteria for PTSS at three months corrected age. This had reduced from 4% at two to 10 days postpartum (Mehler et al., 2014).

Shaw et al. (2009) concluded that their results indicated there may be a potential delayed onset of PTSD symptoms for fathers. They took measures at two to four weeks postpartum and again at four months. No fathers exhibited post-traumatic symptomatology at the first time point, but 33% met criteria for a diagnosis of PTSD at four months. These results indicated a delayed response which was in contrast to the response of mothers. Fathers may feel a need to play a more supportive or protective role in the immediate period after birth, potentially causing their own symptoms to be masked or to develop later. This could be related to the finding that men used a detached coping mechanism significantly

more than women (Elklit et al., 2007). However, the results of Binder et al. (2011) would suggest differently, as their results indicated a reduction in symptoms over time in fathers.

In critique of these studies all the samples were small ($n = 7$ to $n = 27$), which may have impacted the power for small effect sizes to be detected. All studies used different measures to assess PTSD and although all demonstrated good validity and reliability, this may account for differences observed in the results. Direct comparisons between study samples would be more meaningful if the same measure had been used across them. The variation in measures used may have introduced confounding variables. The samples of the studies in this category were biased towards those of high socio-economic status and to have homogeneity on a number of demographic variables, questioning the generalisability of results.

1.5.3.4 Summary and general critique of results of studies reviewed investigating postnatal PTSD in fathers.

The studies discussed suggest that between zero and 11.5% of fathers could experience postnatal PTSD. This increases to up to 33% when considering fathers of babies admitted to the NICU, possibly reflecting the additional potential stressors in this environment (Lefkowitz et al., 2010). Conversely, some of the studies finding no reported prevalence of PTSD were also found when investigating samples of fathers with infants having NICU admissions. Zerach and Magal (2016) have argued that fathers may be prevented from displaying the full range of PTSD symptoms due to the strength and emotional control expected of masculine behaviour. However, this could not be explored fully as the role of masculinity was not assessed in the study. If this is so, the results from these studies collectively may yet be an underrepresentation of PTSD in fathers postnatally.

Only one study specifically investigated fathers of VLBW infants, highlighting the paucity of research into this particular group of births.

Results should be interpreted with caution as sample sizes varied widely as did the time points at which measures were taken and the choice of measures to assess PTSD symptoms. Six of the 13 studies measured PTSD at more than one time point and thus gave some indication of the development of symptoms over time. However, there are inconsistencies as to whether symptoms increase or decrease over time for fathers. Additionally, none of the studies assessed PTSD prior to the birth and during pregnancy to assess this development. The cross-sectional nature of the remaining studies prevent conclusions being drawn about causality or symptom development. The qualitative study (White, 2007) included fathers with varying lengths of time postpartum, including one father for whom it had been 30 years since the birth of their child, and the study by Elklit et al. (2007) took measures up to three-and-a-half years postpartum. Considering the remaining 11 studies, the longest time postpartum in which measures were taken was six months. The results of these studies therefore do not give an indication of potential symptoms at longer time periods postpartum as has been investigated in mothers (Åhlund et al., 2009).

Eleven of the 13 studies used self-report questionnaire measures, which have the potential to inflate prevalence rates (Parfitt & Ayers, 2009). However, Weisaeth (1996) suggested that in PTSD research the more symptoms an individual has, the less likely they are to participate, affecting accuracy of prevalence rates. Although not as effective at identifying diagnosis as a diagnostic clinical interview, self-report measures have important clinical utility in screening for potential distress (Lefkowitz et al., 2010). A difficulty with PTSD measures for this population is that they capture changes in somatic items, hobbies and

socialising, all of which may be affected following the birth of a child regardless of PTSD symptoms (Spencer, 2006).

The most commonly used measure was the IES, which is often used because it allows specification of the stressor that respondents are to consider when providing their answers and thus they can be directed to specifically think about the birth and/or hospitalisation of their infant. Olde, Kleber, Van der Hart, and Pop (2006) argue it is psychometrically stronger in measuring postpartum posttraumatic stress than the IES-R, due to the exclusion of hyperarousal which is commonly present in new parents. However, in a study examining whether hyperarousal symptoms differed between women having traumatic and non-traumatic births, it was found that hyperarousal symptoms were associated with the former (Ayers, Wright, & Ford, 2015), indicating the hyperarousal subscale may be reliable within this population. No study which used the IES or IES-R clearly specified the event they asked respondents to consider when completing the questionnaire (i.e., the whole birth experience, labour, delivery, hospital admission etc.), making it difficult to ascertain what the results pertain to. All studies reviewed were exploratory and/or correlational, meaning that firm conclusion cannot be drawn about the exact nature of this relationship.

The majority of the studies investigated both fathers and mothers, which is consistent with the recommendation of Phares, Lopez, Fields, Kamboukos, and Duhig (2005) to conduct parallel investigations of mothers and fathers. However many obtained a better response rate for mothers, consistent with noted challenges of including men in health research, including a tendency for high attrition rates (Ramchandani et al., 2008). Binder et al. (2011) suggest significant correlations between mothers' and fathers' PTSS highlights the importance of including the father's role in family impact studies. The difficulties of including fathers in research will be further explored in section 1.7.

1.5.4 Postnatal depression and anxiety in fathers.

As discussed in section 1.3.4 comorbidity of PTSD with depression and anxiety is common. The following two sections considers the literature on postnatal depression and anxiety in fathers.

1.5.4.1 Postnatal depression.

The comorbidity of postnatal PTSD and depression has been found to be high (20% to 75%) in women (Stramrood et al., 2011; White, Matthey, Boyd, & Barnett, 2006) with the majority of mothers suffering psychiatric problems having two or more disorders (Brockington, Macdonald, & Wainscott, 2006). Many women with postnatal PTSD are misdiagnosed as having postnatal depression (McKenzie-McHarg et al., 2015) and it is possible that a similar phenomenon occurs for men.

Postnatal depression is only clinically defined in women, but research suggests men can and do suffer from the illness. Spencer (2014) provides an exploration of postnatal depression in fathers in her book and concludes that although the symptoms may differ from those seen in mothers, fathers do experience this phenomenon resulting in sometimes long-lasting and damaging effects for them and their children. DSM-5 (APA, 2013) does not recognise postnatal depression as a separate diagnosis: it is defined as a major depressive episode which has an onset in pregnancy or within four weeks of delivery and thus this criteria could also apply to men.

A literature review by Goodman (2004) revealed 20 studies indicating a 1.2% - 25.5% incidence rate of paternal depression during the first year postpartum. Mothers have been found to score higher for postnatal depression than fathers (e.g. Candelori, Trumello, Babore, Keren, & Romanelli, 2015). However, a large prospective cohort study of 86,957 mother-

father dyads by Davé, Petersen, Sherr, and Nazareth (2010) found: 83% of fathers experienced one depressive episode compared with 77% of mothers; 14% of fathers had two episodes of depression compared with 18% in mothers; and 3% of fathers had three or more depressive episodes, compared with 5% of mothers. The findings suggested that fathers' risk of depression is particularly prevalent in the first year of parenthood when it was found to be at its highest rate (3.56% per 100 person-years), though 21% of fathers had experienced an episode of depression by the time their child was 12 years old. The large sample size in this study indicates good ecological validity of the findings and suggests that fathers are at a similar risk of developing depression following the birth of their child as mothers. A more recent study suggests depression in fathers extends beyond the postpartum period (De Montigny, Girard, Lacharité, Dubeau, & Devault, 2013), with fathers' infants ranging from 16 months to eight-years-old. However, this study only recruited fathers whose partners were breastfeeding and thus preventing a shared role in feeding which can influence parents' feelings following the birth (Spencer, 2014). Mackley, Locke, Spear, and Joseph (2010) found elevated depressive symptomatology has been found in fathers of premature infants at 35 days postpartum, with 36% of fathers scoring 16 or more on the Centre for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977), indicating clinically relevant symptoms. These symptoms had decreased over time, with measures at seven and 21 days postpartum. This study did not use a control group of term fathers with which to compare the results and the sample size was small with 24 fathers completing measurements at all three time-points.

Mehler et al. (2014) found that scores on the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987) were significantly higher for fathers of preterm (13% scoring more than 9) than term infants when measures were taken between two and 10

days postpartum. The rate of postnatal depression had declined by half for the preterm infants when measured at term but did not decrease further up to age three months. In contrast term fathers' levels of postnatal depression increased from term to three months postpartum. There have been few studies which have validated the use of the EPDS in fathers and the measure was specifically developed for mothers. In a study of Swedish fathers it has been shown to be valid for screening probable major depression but not minor depression in fathers (Massoudi, Hwang, & Wickberg, 2013).

1.5.4.2 Postnatal anxiety in fathers.

In a review of the literature on mental health problems in fathers following the birth of their child Bradley and Slade (2011) found three papers focusing on anxiety and concluded that some men may experience postnatal anxiety either in addition to or separately from depression and the prevalence rates may be similar to that of depression in fathers postnatally. Prevalence rates were 9.7% and 4.4% in two samples of fathers six weeks postpartum (Matthey, Barnett, Howie, & Kavanagh, 2003) and 6.6% in a separate sample (Bradley et al., 2008). Feeley, Gottlieb, and Zelkowitz (2007) reported similar levels of anxiety in mothers and fathers of VLBW infants in the first year after birth, and anxiety levels did not change significantly between when their child was three to nine months old. This is consistent with findings from Auslander, Netzer, and Arad (2003) but in contrast to other research which has found mothers to be more anxious than fathers during their infants' NICU hospitalisation and shortly after discharge (e.g., Doering, Dracup, & Moser, 1999; Zanardo & Freato, 2001).

Treyvaud, Lee, Doyle, and Anderson (2014) found primary caregivers (mostly mothers) of very premature children were more likely to report moderate-severe levels of anxiety when their child was seven than parents of term infants. Depression scores were also

higher in the premature group, although average anxiety and depression symptom scores were generally in the normal range for both groups. In parents of very preterm children those reporting significant mental health problems at two years were approximately twice as likely to report problems at seven years although this relationship did not reach statistical significance for predictivity. At two months postpartum state anxiety levels have been found to be higher in fathers than in mothers, although there was no significant difference between fathers of premature and term infants (Ghorbani et al., 2014). This could suggest that anxiety levels are related more to aspects of being a parent rather than the specific needs that might be present in a premature infant. A study by Zerach and Magal (2016) found anxiety rates of 6% to 13.8% in first time fathers which they felt may reflect the nervousness at becoming a father for the first time and is similar to the levels of 8% found in first time fathers at five months postpartum by Parfitt and Ayers (2014). Comparison with measures taken during pregnancy showed this level had reduced. Fathers' levels of postnatal anxiety have been shown to be lower than in mothers, however, males do experience high levels of state anxiety (Candelori et al., 2015).

1.6 Clinical Implications of the Literature on Postnatal PTSS in Fathers of VLBW Infants

White (2007) noted that fathers' stories are often embedded in mothers' stories of birth trauma, making the needs of fathers unknown. Findings suggest greater importance should be placed on hearing the father's story in order to ascertain what clinical support may be needed. This section will consider some of the clinical implications of the literature which suggests that fathers may be susceptible to developing PTSS following the birth of their VLBW infant.

1.6.1 Considering the potential impact of fathers' PTSS on attachment patterns.

Fathers' reactions to the birth of VLBW infants could have additional implications beyond their own well-being. The mental health of fathers may impact upon the attachment relationships they develop with their infant and their parenting behaviours. Attachment patterns and parenting behaviours have been shown to affect child behaviour and psychosocial functioning. A father needs to have the mental and emotional resources in order for him to develop this relationship (Fletcher, Matthey, & Marley, 2006). Wilson and Durbin (2010) note that there are a number of implications for children's psychosocial and physical adjustment from impairments to both parenting behaviours and the parent-child bond. Risks to social, psychological and cognitive deficits in children increase if both parents suffer from depression (Burke, 2003; Carro, Grant, Gotlib, & Compas, 1993). Ramchandani, Stein, Evans, O'Connor, and ALSPAC Study Team (2005) found that fathers who were depressed at eight weeks postpartum had children who were at double the risk of behavioural and emotional problems at three and half years of age. Behaviour problems in children can be predicted by remote father-child interactions in the third month of life (Ramchandani et al., 2013). VLBW infants will have risks to psychological and cognitive development as a result of their birth weight as discussed in section 1.2.2. Additionally, these infants are likely to have delayed attachment development with their parents as a result of their health status and being hospitalised in the NICU as discussed in section 1.2.4.

Belsky's (1984) model of parenting suggests three primary determinants of the quality of the parent-baby relationship with the highest priority being the parents' psychological well-being, followed by contextual sources of stress and support and then characteristics of the child. A mental health disorder in a parent can profoundly affect the parent-infant relationship and as a consequence the child's emotional development and wellbeing (All

Party Parliamentary Group [APPG] for Conception to Age 2: The First 1001 Days, 2015).

Postpartum PTSS has been shown to interfere with mother-infant attachments (Ayers, Eagle, & Waring, 2006; Davies, Slade, Wright, & Stewart, 2008) and it may be that mothers avoid attachment and interactions with their infants to reduce triggers which may occur from the infant, which could be equally applicable to fathers. Fathers' mental health difficulties (anxiety, depression and PTSD) have been shown to significantly predict the parent-baby bond at three months, with affective symptoms predictive at 15 months (Parfitt, Ayers, Pike, Jessop, & Ford, 2014).

Parfitt and Ayers (2012) suggest anxiety, depression and PTSD could negatively affect parents' perceptions, sensitivity and ability to interpret and respond to their baby's signals. They found parents commented significantly more frequently on their absence of bonding with their child if they experienced postpartum mental health symptoms, including PTSD. This is supported by other studies finding that parents suffering from postnatal PTSD can show evidence of a disturbed parent-baby relationship (e.g., Nicholls & Ayers, 2007; Parfitt & Ayers, 2009). Marland and Martin (2012) suggest depression and anxiety can potentially weaken a father's nurturing resources and when both parents suffer from depression their children are at particular risk of social, psychological and cognitive deficit (Burke, 2003).

Other research has found that there is no significant differences in father-infant interactions between depressed and non-depressed fathers (Field, Hossain, & Malphurs, 1999). However, there were significant differences between depressed fathers and depressed mothers on several attachment behaviours, with fathers receiving higher ratings than mothers. They suggested that fathers may compensate for depressed feelings through their more playful style of interacting, or by coping in a more active way. DelCarmen-Wiggins,

Huffman, Pedersen, and Bryan (2000) found that depression and anxiety symptoms strongly predicted the security of father-infant attachment at three years postpartum. Similarly, Hjelmstedt and Collins (2008) demonstrated that father-infant attachment is explained by scores of state anxiety: less anxious fathers were more attached to their infants. Depressive symptoms were significantly correlated with attachment at two months, but did not predict scores on the attachment measure; indicating anxiety had a greater impact than depression. In contrast, Mercer and Ferketich (1990) found anxiety to have a greater impact than depression. These studies all point to postpartum mental health problems having an impact on the father-infant attachment. The impact of these could be further compounded as fathers have been found to have significantly greater difficulty than mothers interacting with their infants because of concerns about their child's fragility (Moehn & Rossetti, 1996) and fathers of preterm infants may be less responsive than fathers of term infants (Harrison & Magill-Evans, 1996).

1.6.2 Service provision for fathers.

Where specific perinatal health services exist they are rarely able to offer assessment or address the needs of the father (Currid, 2005; Fletcher, Vimpani, Russell, & Sibbritt, 2008; Thomas & Upton, 2000). Providing services for fathers could be compounded by the finding that men hide their emotions to protect themselves and their partner (Candelori et al., 2015). The National Institute of Clinical and Health Excellence (NICE, 2014) provides guidance for clinical management and service provision in antenatal and postnatal mental health which is aimed at supporting women with perinatal difficulties. There is no guidance to support men or guidance specifically for preterm labour and birth. However, there are moves to improve the support in perinatal and early years' health services to particularly focus on strengthening parent-infant attachment. The Government cross-party manifesto, 1001 Critical Days,

highlights the importance of intervening with perinatal mental health difficulties early (from conception to the first two years of life), however only 3% of Clinical Commissioning Groups in England currently have a perinatal health strategy (APPG for Conception to Age 2: The First 1001 Days, 2015). The manifesto focuses on the needs of the mother with the fathers' needs given less consideration, which may be due to the paucity of research into men's perinatal mental health difficulties.

In a qualitative study by Hinton, Locock, and Knight (2014) which examined partners' experiences of "near miss" events during childbirth where the mother nearly died, some partners described finding it hard to find support and acknowledgement for their distress. One father described his difficulties not being acknowledged by his General Practitioner (GP) with others finding it difficult to talk to friends and family. Hinton et al. (2014) suggest a need for the development of guidance for supporting partners through pregnancy and childbirth. There are many different factors to consider here, with it being likely that different types of support are needed for fathers depending on their partner's childbirth experience (i.e. support needed for a father whose partner who had an uncomplicated delivery of a healthy term infant may look very different from that needed by a father of a VLBW infant). In order to provide appropriate service support for men it is important to understand the needs of fathers so services can be designed appropriately.

In June 2015 a new organisation was launched, Dads Matter UK, which aims to raise awareness and educate fathers before the birth about birth trauma for men and the possible resulting mental health difficulties, including PTSD, depression and anxiety. This organisation and other similar campaigns are increasing the awareness of the perinatal mental health needs of fathers and highlighting the gaps in service provision to support with these difficulties. Fletcher et al. (2006) note economic and cultural challenges to involving new

fathers in health service provision, with fathers often being unable to attend health service visits. However, a recent study found that two thirds of fathers do attend routine antenatal appointments (Redshaw & Henderson, 2013). It may be that further consideration is needed as to how these fathers can be supported when they do attend appointments.

Specific service provision in the NICU is perhaps further advanced than in general perinatal health care. NICUs aim to use family centred care (FCC), an approach to ensure care is planned around the whole family with all family members being care recipients, not just the individual child (Shields, Pratt, & Hunter, 2006), with the aim of empowering and involving parents in the care of their infant (Cooper et al., 2007). FCC is part of one of the eight principles of the Toolkit for High-Quality Neonatal Services (U.K. Department of Health, 2009) which is designed to support commissioners and service providers to improve neonatal services. It is thought that FCC can enhance attachment between the baby and the family with resulting long-term outcome improvements. Petersen, Cohen, and Parsons (2004) note a lack of detail on parent participation in the NICU and although nurses are committed to FCC it is incompletely or inconsistently applied in neonatal care (Trajkovski, Schmied, Vickers, & Jackson, 2012).

1.7 Importance and Difficulties of Including Fathers in Research

Phares (1996b) noted that she is often asked to define “father” but not asked to define “mother” and there is a lack of consensus in the literature on how to define fathers (Phares et al., 2005). In paediatric research mothers and fathers are often both included in samples but are not analysed separately for effects; at other times participants are referred to as “parents” without indication of whether they are mothers or fathers (Phares et al., 2005). An additional problem is the challenge of recruiting fathers into research. Costigan and Cox (2001) recommend that fathers should be contacted directly to participate in research, as frequently

mothers may serve as gatekeepers to them participating if requests go through them. They also suggest that research which is framed for the importance of fathers in their children's lives may help increase their participation in such research. Binder et al. (2011) concluded that their findings highlighted the importance of including the father's role in family impact studies and argued for the consideration of the family as a "complex multi-relationship matrix". Deeney et al., (2009) suggest the need for a reconceptualisation of parenthood as an inter-relational concept between men and women rather than the current focus on women and childcare and its link with femininity.

1.8 Rationale for the Current Study

The literature presented in this chapter provides strong evidence that fathers have the potential to experience PTSS following the birth of their VLBW infant. This has a significant impact on men, their attachment to their infant and potentially their parenting behaviour. Disruptions in the development of the father-infant bond have been shown to impact a child's psychological, social and cognitive development. The development trajectory for VLBW infants is likely to be impacted already as a result of complications arising due to their birthweight. Thus these infants are at increased risk if the father-infant bond is compromised by poor paternal mental health. Additionally there is poor perinatal mental health service provision for fathers and particularly poor understanding of the potential for them to experience PTSS. Given this literature there is a strong argument for further exploration of this area.

The literature also supports the lack of current research into PTSS in fathers. In concordance with recommendations from the review by Karatzias et al. (2007) on PTSD in parents of premature infants, there is a need for more research on fathers, including longer-term follow-up assessments of symptoms; recommendations which aim to be addressed by

the current study. The current study will investigate PTSS rather than PTSD because of its applicability in service provision and the practicality of investigating PTSS which can be assessed through self-report measures rather than the need to use clinical interviews to measure PTSD diagnosis.

In line with the recommendations of Phares et al. (2005) that when a characteristic of mothers is investigated it should also be investigated in fathers, the current study will aim to replicate the study by Åhlund et al. (2009), which found mothers to experience PTSS two to three years following the birth of their VLBW infant, with fathers. The current research is important to assess the similarities and differences in the responses of mothers and fathers. This study will also expand on some of the procedures from the mothers' study to build a more detailed picture of PTSS in fathers. Additionally, the study will aim to elucidate further understanding of PTSS in fathers and its relationship with depression and anxiety. Based on findings presented in section 1.2.6 of the potential importance of social support in the NICU a measure of this will also be taken and consideration will be given to any mediating effects between all these factors.

1.9 Research Questions

Based on the review of the literature, four research questions were identified for the current study:

1. Is there a difference in the levels of PTSS in fathers of VLBW infants and fathers of term infants two to four years postpartum?
2. Is there a difference in the levels of anxiety and depression in fathers of VLBW infants and fathers of term infants two to four years postpartum?

3. In fathers of VLBW infants, is there a relationship between levels of perceived social support at the time of the birth and hospitalisation of their infant and levels of PTSS, anxiety and depression two to four years postpartum?
4. How do levels of PTSS in fathers of VLBW infants compare to levels of PTSS in mothers of VLBW infants two to four years postpartum? This will be explored by making comparisons between findings of the current study and those of Åhlund et al.'s (2009) study.

Chapter Two: Research Methodology

2.1 Design

This study used a quantitative between-groups design to compare fathers of VLBW infants with fathers of term infants two to four years postpartum on measures of PTSS, anxiety, depression and social support. The decision to employ a two to four years postpartum time period for this study was made in consideration of the gaps in previous research conducted in this field. The limited research on the psychological reaction of fathers following the birth of a VLBW infant has focussed on the short-term effects (e.g. Lefkowitz et al., 2010; Shaw et al., 2009). Deeney et al. (2009) note that research on fathers of premature infants has focussed on the acute hospital experience with little follow-up research in the community. This study therefore attempted to address the need for both longer-term and community follow-up in this population. Additionally, mothers' and fathers' psychological responses were compared using comparisons of data from the current study with data from Åhlund et al.(2009) study of PTSS in mothers. Using a similar recruitment time-period postpartum ensured the two studies could be compared in a meaningful manner.

Recruitment to the current study occurred through two routes: postal questionnaires and questionnaire administration at a two-year follow-up clinic. The cross-sectional nature of

this study indicated that questionnaires be administered at a single time-point. The time-frame employed in this study aimed to add to the existing literature base which had not addressed this period postpartum in detail for fathers.

2.2 Participants

Participants included 26 fathers of VLBW infants born at and/or cared for at the Norfolk and Norwich University Hospital (NNUH) NICU and 22 fathers of term infants born at the NNUH between June 2011 and November 2013. The NNUH NICU is one of two centres providing specialist level three neonatal, medical and surgical intensive care across Norfolk, Suffolk and Cambridgeshire. The NICU has areas for intensive (ITU), high dependency (HDU) and special care, they can care for 42 babies at any one time. The ITU cares for babies with the most complex problems requiring constant supervision and monitoring, and, usually mechanical ventilation; HDU cares for infants requiring continuous monitoring but not meeting criteria for intensive care, special care beds are for babies who do not need continuous monitoring and are stable. In the current study the term “father” refers to the male who considered themselves the father at the time of the birth of the child and was present at the birth.

2.2.1 Inclusion criteria.

The inclusion criteria for the study were chosen to ensure that the fathers participating had infants who were between two years and four years postpartum at the time they completed the study measures. Fathers were invited to participate if:

- their infant was born between 2011 and 2013;
- they were English-speaking;
- they were over the age of 18.

Specific inclusion criteria also applied for each group of fathers as detailed in sections 2.2.1.1 and 2.2.1.2.

2.2.1.1 Specific inclusion criteria for fathers of VLBW infants.

Fathers of VLBW infants were invited to participate if their infants:

- were admitted to the NNUH NICU (the infants could have been born at the NNUH or at another hospital and then transferred to the NNUH NICU after birth); and
- weighed less than 1500 grams at birth.

2.2.1.2 Specific inclusion criteria for fathers of term infants.

Fathers of term infants were invited to participate if their infants:

- were born via unassisted vaginal delivery;
- were born at the NNUH; and
- were born at term (>37 weeks gestation).

2.2.2 Exclusion criteria.

Fathers were excluded from an invitation to participate in the study if:

- they were under the age of 18;
- they were non-English-speaking (time and funding limitations prevented questionnaire translation)
- their infants had died;
- their infants were adopted; and
- their infant was younger than two years or older than four years at the time of participant recruitment.

Additionally, fathers of term infants were excluded if their infant required admission to the NICU.

2.2.3 Participant demographics

This section describes the demographics of the study's sample. Tables 1 and 2 display participants' ethnicity and the number of participants in each age group category for the two groups.

Table 1

Participants' Ethnicity

Ethnicity	Frequency (%)	
	VLBW (<i>n</i> = 26)	Term (<i>n</i> = 21) <i>Missing n</i> = 1
White British	22 (84.8)	21 (95.5)
White Irish	1 (3.8)	0
White European	1 (3.8)	0
Black Other	1 (3.8)	0
Asian British	1 (3.8)	0

Table 2

Participants' Age Group Category

Age Group	Frequency (%)	
	VLBW (<i>n</i> = 26)	Term (<i>n</i> = 21) <i>Missing n</i> = 1
25 – 29	0 (0.0)	2 (9.1)
30 – 34	8 (30.8)	6 (27.3)
35 – 39	9 (34.6)	6 (27.3)
40 – 44	5 (19.2)	4 (18.2)
45 – 49	3 (11.5)	2 (9.51)
50 +	1 (3.8)	1 (4.5)

The majority of participants were married at the time of the birth of their child in both the VLBW (*n* = 18, 69.2%) and the term group (*n* = 19, 86.4%). The remaining participants were cohabiting (VLBW *n* = 7, 26.9%; term *n* = 2, 9.1%). One participant in each group did not answer this question. One participant's marital status in each group had changed since the birth of their child; they had been cohabiting and were now married. Missing data for this question in the VLBW group was *n* = 1 and in the term group was *n* = 3. In the VLBW group, the majority of fathers currently live with their child (*n* = 24, 92.3%) with one (3.8%) living with their child at alternate weekends, one participant (3.8%) did not answer this question. All participants in the term group currently live with their child (95.5%) with one set of data missing (4.5%). Table 3 shows the employment status of the fathers at the time of the birth of their child.

Table 3.

Employment Status of Participants

Employment Status	Frequency (%)	
	VLBW (<i>n</i> = 26)	Term (<i>n</i> = 21) <i>Missing n</i> = 1
Full-Time	23 (88.5)	18 (81.8)
Part-Time	1 (3.8)	3 (13.6)

2.2.3.1 Infant demographics.

There was one set of twins in the VLBW group, but no twins in the term group. In the VLBW group 17 (63.0%) of the infants were male and 10 (37.0%) were female. In the term group 13 (59.1%) infants were male and 9 (40.9%) were female. Table 4 displays data for birth weight, gestational age, and the length of time postpartum when participants completed the questionnaires (infant age), for both groups.

Table 4

Data for Birth Weight, Gestational Age and Infant Age

	Birth Weight (grams)	Gestational Age (days)	Infant Age (years)
	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)
VLBW (<i>n</i> = 26)	1108 (284)	199 (18.5)	3.40 (0.72)
Term (<i>n</i> = 22)	3517 (407)	278 (8.51)	3.76 (0.69)

2.3 Sample Size and Power Analysis

Two pieces of previous similar research were used to calculate the a priori power analysis; studies by Åhlund et al. (2009) and Ghorbani et al. (2014). Åhlund et al. (2009) compared PTSS in mothers of VLBW infants with mothers of term infants two to four years postpartum ($N = 37$). Ghorbani et al., (2014) compared anxiety, posttraumatic stress and social supports in mothers and fathers of premature and term infants ($N = 164$). The power analysis was calculated using G*Power (Version 3.1.9.2.), this calculation determined the sample size needed for the current study which would enable the null hypothesis to be rejected correctly should the alternative hypothesis be true.

The effect size was not reported in the published paper by Åhlund et al. (2009), however the raw data from this study were available to the current author which enabled effect sizes to be calculated. Based on statistical power at 0.8 and a significance level of 0.05, using the effect size of 0.79 (calculated from Åhlund et al., 2009), it was calculated that 27 participants were required in each group for the current study, giving a total sample size of 54. Based on the same power (0.8) and significance level (0.05), using the effect size of 0.71 (reported by Ghorbani et al., 2014), it was calculated that 33 participants were required in each group, giving a total sample size of 66.

As the study by Åhlund et al. (2009) used the IES-R but did not investigate fathers and the study by Ghorbani et al. (2014) investigated fathers but did not use the IES-R and given the lack of current literature in this area and the potential clinical importance of the results, the more conservative effect size of 0.71 was used to guide the required sample size for the current study. Thus to provide sufficient power for the research questions to be addressed the total sample size for this study was 66 fathers (33 fathers of VLBW infants, 33 fathers of term infants).

The sample size in the current study was a total of 48 fathers, with 26 in the VLBW group and 22 in the term group. Therefore this did not meet the target of 33 in each group as recommended by the power analysis using the study by Ghorbani et al. (2014). Details of recruitment efforts can be seen in Appendix A. The effect size for the current study when exploring the main outcome measure, differences in scores on the IES-R indicating PTSS levels between fathers of VLBW infants and fathers of term infants, was medium at 0.62. Cohen (1988) recommends that a medium effect size is considered to be $d = 0.5$ to 0.79. The effect size of the current study was used to calculate a post-hoc power analysis using G*Power (Version 3.1.9.2), this revealed that the study was underpowered at 0.55, meaning the results need to be interpreted with caution. In order for the effect size found in this study (0.62) to be found in the study with sufficient power (0.8) then a sample size of 42 in each group would be required were the study to be replicated.

2.4 Measures

A range of measures were used in this study to address the research questions. This section contains a detailed description of the measures used and consideration of their reliability and validity in this population. Measures used by Åhlund et al. (2009) guided the choice for the current study in order to allow meaningful comparisons to be made between the two studies. The measures were chosen to ensure their brevity whilst answering the study questions. It was reasoned that a better response rate would be achieved if questionnaires were kept as brief as possible whilst still obtaining the necessary data; thus questionnaires took a total time of approximately 25 minutes to complete.

2.4.1 Impact of Events Scale-Revised (IES-R).

PTSS was measured using the IES-R (Weiss & Marmar, 1997), a 22-item self-report measure assessing subjective distress and traumatic symptoms following a specific life event. The IES-R asks participants to think of a life event that was stressful and then to indicate how much they were distressed during the past seven days by a list of difficulties. On the IES-R participants are asked to indicate how distressing each item has been for them in the previous seven days on a five-point Likert scale ranging from 0 (“not at all”) to 4 (“extremely”). The life event for this study was specified as the birth of the father’s child and their experience of the care given at the NNUH in the period between birth and discharge. Goodyear (1990) defined a life event as “any event or circumstance occurring in the life of an individual that may have the potential of altering an individual’s present state of mental or physical health” (p.5). Guzmán and Essau (2011) noted that this definition makes no assumption about the type, duration or effects of the event. Goodyear (1990) argues for certain events to be seen as a continuous process rather than independent events, for example a surgical procedure at the end of an illness. Given these definitions and discussions, although the life event for this study is over a period of time it can still be considered as a single event.

Two versions of the IES-R were used in this study. The difference in the two versions was the wording of the life event specified; for fathers of VLBW infants the wording related specifically to their infant’s birth and hospitalisation in the NICU, for fathers of term infants there was no reference made to the NICU (Appendix B). The life event was specifically chosen to be the birth and hospitalisation in NICU because the research was interested in the fathers’ whole experience of the birth of a VLBW infant; the hospitalisation of their infant is a major component of this. Previous research shows fathers frequently experience a lack of control whilst their baby is cared for in the NICU (e.g. Arockiasamy et al., 2008), perceived

lack of control has been correlated with initial PTSD severity (Dunmore, Clark, & Ehlers, 2001) and to a persistent stress response for several years after the traumatic event (Baum, Cohen, & Hall, 1993). The IES-R was chosen over other measures of PTSD because it was the measure used by Åhlund et al. (2009) and as such the wording used to describe the traumatic event for this study was similar, this therefore allowed comparison of data from the two studies. Additionally it is a brief measure of PTSS and is frequently used in clinical settings as a screening tool for PTSS.

The IES-R comprises three subscales: Intrusion, Avoidance and Hyperarousal which correspond to the DSM-IV-TR (APA, 2000) criteria for PTSD. More recently the DSM-V (APA, 2013) has categorised the symptoms of PTSD into four distinct diagnostic clusters: re-experiencing, avoidance, negative cognitions and mood, and arousal. Current PTSD measures have not yet been altered to reflect this change in diagnostic categories. There have been some noted concerns regarding the three-factor structure of the IES-R, with confirmatory factor analysis using the three subscales as a model not providing a good account of the data (Creamer, Bell, & Failla, 2003), however, this is a common finding with other PTSD measures as well and Creamer et al. suggest this relates to the validity of the DSM conceptualisation of the disorder. They argue that as diagnostic criteria tends to changes, as is evident with the new criteria of DSM-5 (APA, 2013), there are advantages to a measure assessing the core constructs characterising traumatic stress as the IES-R does. This also makes it an ideal measure for the current study, being interested in the prevalence of symptoms as opposed to the prevalence of diagnostic PTSD.

Creamer et al., (2003) reported high internal reliability for the IES-R total scale (Cronbach's $\alpha = 0.96$) and for the three subscales (intrusion = 0.94, avoidance = 0.87 and hyperarousal = 0.91) in male Vietnam veterans. They also assessed construct validity by

comparing with the PTSD Check List (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL was designed to assess the DSM-IV (APA, 1994) symptoms of PTSD and thus is a measure more closely tied to these symptoms. Total scores on both scales were highly correlated ($r = 0.84$, $p < 0.001$; Creamer et al., 2003). The IES-R has been used in a previous study of mothers of VLBW infants born at the NICU at NNUH (Åhlund et al., 2009) and the German version of the IES-R in a study of parental traumatisation in both mother and fathers of preterm infants (Mehler et al., 2014). Other studies of fathers have used the previous version of the IES-R, the IES (e.g. Skari et al., 2002).

2.4.2 Generalised Anxiety Disorder Seven-Item Scale (GAD-7).

Anxiety symptoms were measured using the GAD-7 (Spitzer, Kroenke, Williams, & Löwe, 2006; Appendix C), a seven-item self-report questionnaire, developed to diagnose generalised anxiety disorder. It has also proved to have good sensitivity and specificity as a screen for panic, social anxiety and PTSD (Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007). Participants are asked to indicate how much each item has bothered them in the previous two weeks on a four-point Likert scale ranging from 0 (“not at all”) to 3 (“nearly every day”). The GAD-7 has shown good internal consistency for adults meeting criteria for generalised anxiety disorder (Cronbach’s $\alpha = 0.79-0.91$; Dear et al., 2011). Löwe et al. (2008) concluded that the GAD-7 is a reliable and valid self-report measure for anxiety in the general population following their study of more than 5000 participants; good construct validity was also demonstrated by inter-correlations between concepts measured in the GAD-7 and the association between known risk factors and the GAD-7 sum score. Additional to these psychometric properties, the GAD-7 is also a brief measure which made it appropriate for the current study.

2.4.3 Patient Health Questionnaire-9 Depression Scale (PHQ-9).

Depression symptoms were measured using the PHQ-9 (Kroenke & Spitzer, 2002; Appendix D) a nine-item self-report measure for screening, diagnosing, monitoring and measuring the severity of depression. It incorporates DSM-IV-TR (APA, 2000) depression diagnostic criteria and is a brief measure, being half the length of many other depression measures (Kroenke, Spitzer, & Williams, 2001) and thus appropriate for this study as this was a key criteria in selecting measures. Additionally, it has comparable sensitivity and specificity (both being 88% for major depressive disorder) to other measures of depression (Kroenke et al., 2001).

Participants are asked to indicate how much each item has bothered them in the previous two weeks on a four-point Likert scale ranging from 0 (“not at all”) to 3 (“nearly every day”). The PHQ-9 has demonstrated high internal consistency in a sample of patients referred by their GP to mental health workers, 26% were male, (Cronbach’s $\alpha = 0.83$; Cameron, Crawford, Lawton, & Reid, 2008) and had diagnostic validity in a sample of 3000 primary care patients (66% female, 34% male; Kroenke et al., 2001).

2.4.4 ENRICHD Social Support Inventory (ESSI).

Fathers’ perceived social support at the time of the birth and hospital admission of their child was measured using the ESSI (Mitchell et al., 2003; Appendix E). The ESSI was designed for use with patients recovering from myocardial infarction and assesses emotional support provided by a patient’s social network. It aims to assess perceived as opposed to received support and functional rather than structural aspects of the social network. It assesses support from family, friends and partners and also the social support provided by other patients and hospital staff. Assessing support provided by other patients/parents on the

wards and hospital staff was an important consideration for the current study given the amount of time fathers of VLBW infants are likely to be surrounded by medical staff. As the ESSI was developed for a hospital setting it meant that this was an aspect of social support that the measure aimed to capture, other social support measures specifically talk about friends, family members and partners; the non-specific wording of the ESSI means all aspects of social support can be considered. Previous research has suggested the support from hospital staff may be an important factor for this population in terms of their experiences of having a baby in the NICU (Garten et al., 2013), which could impact on the longer term psychological sequelae. A key advantage of this measure is that it is brief.

The ESSI is a seven-item measure assessing the availability of support from any network member. It assesses four attributes of social support: emotional, instrumental, informational, and appraisal. Participants indicate how closely the statement describes their situation on a five-point Likert scale ranging from 0 (“none of the time”) to 5 (“all of the time”) for six items. The seventh item asks about the presence of a spouse/partner, a score of 4 is given if the respondent answers “yes” and a score of 2 if they answer “no”. For the current study participants were asked to indicate their responses according to their perceptions at the time of the birth of their child so questions were written in the past tense. A total score is obtained by summing the response for each item, higher scores indicate greater social support. Mitchell et al. (2003) found the ESSI to have good internal consistency with a Cronbach’s $\alpha = 0.86$ for patients recovering from myocardial infarction. Vaglio et al. (2004) found a Cronbach’s $\alpha = 0.88$ in patients undergoing percutaneous coronary intervention to treat ischemic coronary artery disease. They also found the test-retest reliability showed no significant differences in mean scores of questionnaires administered one month apart. An intra-class correlation coefficient of 0.94 was reported.

To the author's knowledge, there has been no reported research using the ESSi in populations other than those recovering from heart disease.

2.4.5 Demographic information.

Participant and infant demographic information were collected using a questionnaire specifically designed for this study (Appendix F). Information collected included the father's age, ethnic origin, marital status (both current and at the time of the birth), whether they live with their child currently, employment status, paternity leave allowance and whether they suffered from psychological difficulties prior to the birth of their child. Additional information routinely clinically recorded on infants was collected from the NNUH neonatal electronic patient record and maternity birth register with parental consent. Information included the infant's gender, birth weight and birth gestational age, and for VLBW infants; length of hospital stay, and if treated in ITU, HDU or specialist care. The NICU Clinical Research Nurse accessed this information for VLBW infants and the IT Support Midwife accessed the information for term infants.

2.5 Procedure

Ethical approval for the research was granted by the London-Fulham Research Ethics Committee in May 2015 (see section 2.6.1). Prior to the submission to the ethics committee, the chief investigator attended a parent-baby group specifically for parents of babies who have spent time on the NICU organised by Bliss (a charity supporting families of premature and sick babies). The group is open to them from discharge till infants are six months old. On the day of attendance only mothers were present at the group. Their views were sought on a specific aspect of the procedure of the study: whether study invite letters should be addressed to fathers directly at the home of their infant or to the "parent" with instructions

that only fathers were required to respond. Mothers in the group felt that it was important that letters be addressed to fathers as it was their responses that were being sought. The mothers stated that their partners often felt “separate” from many of the hospital events and that all information went through the mothers. Therefore fathers were contacted via the address of their infant. This is also in line with the recommendation of Phares et al. (2005) that researchers should seek to contact fathers directly when attempting to recruit them to research to increase inclusion of fathers in paediatric research. The wording of the study paperwork, including the study invite letters, cover letter and participant information sheets was reviewed by the Bliss Research Engagement Officer, who made some minor changes to the language and phrasing used to increase its accessibility.

The following section outlines the research procedures followed in the study, which complied with the above ethical approval. Figure 3, on page 74 provides an illustrative overview of the recruitment process.

2.5.1 Recruiting fathers of VLBW infants.

Two procedures were used to recruit fathers of VLBW infants in order to maximise recruitment opportunities.

2.5.1.1 Procedure one.

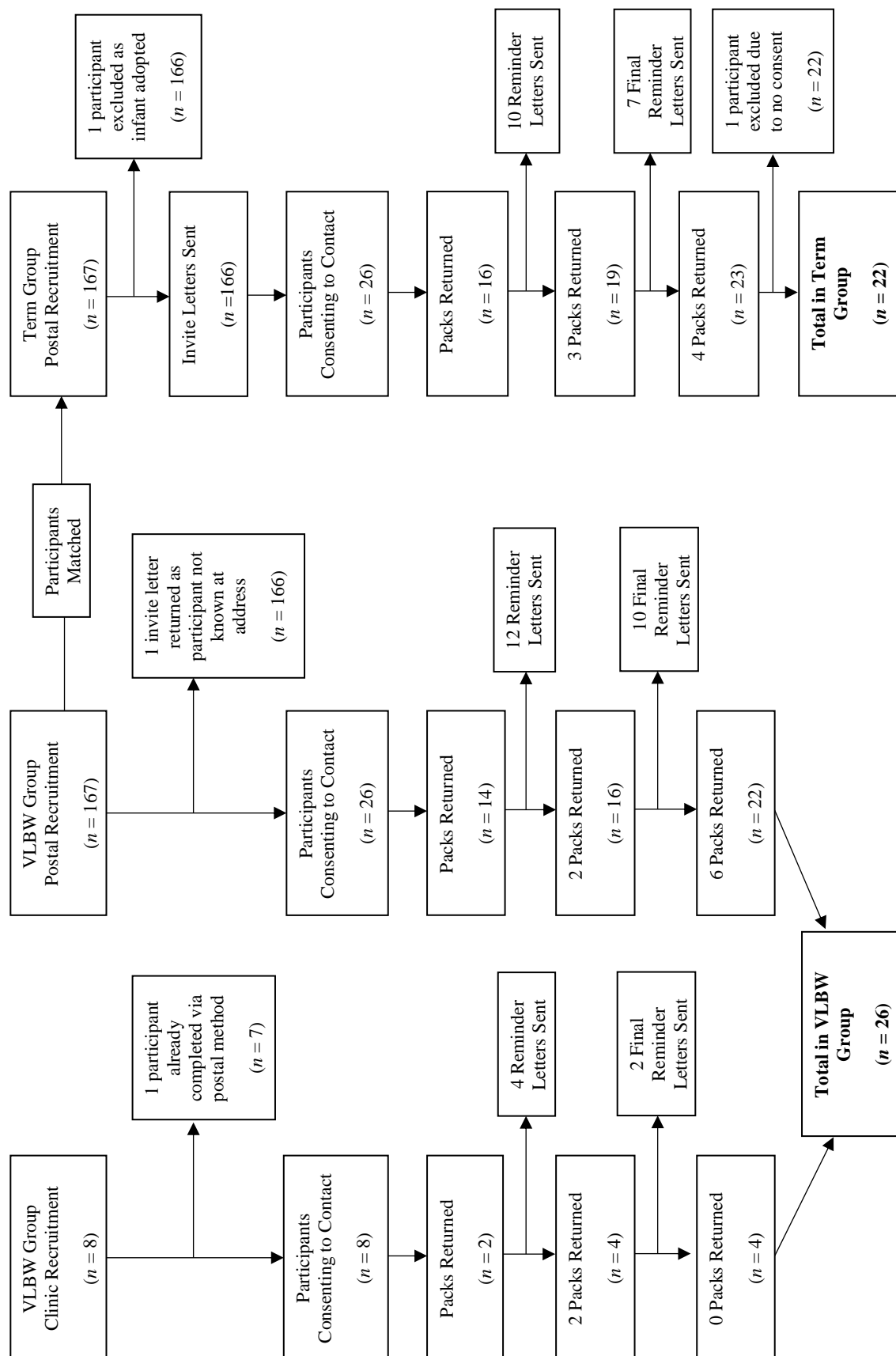
All VLBW infants born between June 2011 and June 2013 weighing <1500g were identified by a NICU Clinical Research Nurse through the neonatal electronic patient record. The details of these fathers were entered onto a secure database at the hospital created for this study along with a unique study number for each father. A study invite letter from the clinical collaborator (Appendix G) was sent to all eligible fathers meeting inclusion and exclusion criteria ($n = 167$) briefly detailing the study and asking fathers to indicate if they

would be interested in finding out more and if they consented to the chief investigator contacting them; a stamped-addressed envelope was provided for their response. Fathers who consented to being contacted were sent a participant pack including a covering letter (Appendix H) participant information sheet (Appendix I), consent form (Appendix J), the questionnaires (Appendices B-F) and a stamped-addressed envelope to return the completed pack. Fathers not returning their questionnaires within four weeks were sent a reminder letter (Appendix K). A total of 12 reminder letters were sent to participants within this particular recruitment procedure. A further final reminder letter (Appendix L) along with a new participant pack was sent to any remaining fathers not returning their questionnaires after another four weeks, 10 final reminder letters were used in this strand of recruitment. The final reminder letter was an amendment submitted to the ethics committee for approval, see section 2.6.1 for details.

2.5.1.2 Procedure two.

An additional recruitment procedure was employed for fathers of VLBW infants as there were some concerns regarding response rates for questionnaire packs; it was felt that if fathers were seen in clinic this may improve response rates. Therefore, fathers of infants born during 2013 weighing <1500g were also invited to participate in the study at their infant's two-year follow-up clinic appointment that was specifically for neurodevelopmental checks. The clinic occurs monthly and generally three families are seen per clinic. The fathers approached at the clinic may also have received a study invitation through the post, this was acknowledged when speaking with the fathers about the study in the clinic.

The chief investigator attended the clinics. During the clinic the Consultant



Neonatologist enquired if the fathers had received an invite letter for the study through the post and asked if they have already responded. Fathers who had responded were thanked for their time. If they had not they were given an invite letter written specifically for the clinic (Appendix M) with the explanation that the chief investigator would be available to meet them following the clinic appointment to provide the participant pack including an information sheet specifically for the clinic recruitment (Appendix N) and consent form (Appendix J) should they wish to participate. Fathers wishing to participate were given the option to either complete the questionnaire at the clinic or at home. The reminder letter (Appendix K) was used for those fathers not returning their questionnaires within four weeks, four reminder letters were sent. The final reminder letter (Appendix L) was sent to two of the fathers recruited through the clinic. During the data collection period there were eight clinics which the chief investigator was able to attend, four fathers were recruited via this method.

2.5.2 Recruiting fathers of term infants.

Fathers of term infants were recruited via a single procedure. Fathers were selected using the inclusion and exclusion criteria and by matching date of birth to the VLBW infants born between June 2011 and June 2013 identified in procedure one for VLBW infant recruitment. The contact details of these fathers were accessed by an IT Support Midwife through the NNUH's birth register. It was not possible to match fathers who actually took part in the study, however, by matching them at the point of inviting them it was hoped that this would provide some control for extraneous variables, e.g. length of time postpartum. Details of the identified fathers matching the inclusion and exclusion criteria were securely sent to the NICU Clinical Research Nurse in order that the details could be added to the study database and the invite letter (Appendix G) could be sent to them. All of these fathers were

provided with a unique study number. Following this identification the same process as detailed in *procedure one* for the VLBW fathers above was followed. For term fathers 10 reminder letters and seven final reminder letters were used.

2.5.3 Following receipt of questionnaires.

All questionnaires were pseudo-anonymised through use of a unique study number. On receipt of the completed questionnaires the chief investigator sent the participants' study number to the NICU Research Administrator. Using the study number further demographic information (as detailed in the measures section) was obtained from the study database for each father. This information was sent by the NICU Research Administrator securely to the chief investigator for analysis. All father and infant identifiers were redacted and individuals were labelled with the study number only. Following data analysis, it was agreed a summary of the results would be sent to participants who had indicated they would like one on their consent form.

2.5.4 Time scale rationale.

The decision to conduct this study two to four years postpartum was made for several reasons. Firstly, the limited research that has been conducted on the psychological reaction of fathers following the birth of a VLBW infants has focussed on the short-term effects (e.g. Lefkowitz et al., 2010; Shaw et al., 2009). Deeney et al. (2009) note that research on fathers of premature infants has focussed on the acute hospital experience with little follow-up research in the community. Even in women there are few studies of postnatal PTSD which assess the presence of PTSD beyond a year postpartum (McKenzie-McHarg et al., 2015) and thus the area represents a gap in the literature. Secondly, the aim was to compare the data from this study with that found in mothers by Åhlund et al. (2009) where they used a time-

frame of two to three years postpartum. The current study extended this slightly to up to four years postpartum to aid recruitment. By recruiting from a similar time period, data from the two studies could be compared more meaningfully.

Finally, some of the literature on postnatal mental health problems in fathers indicates that they may develop later in fathers. Postnatal depression has been found to often occur later in fathers than mothers (Paulson & Bazemore, 2010; Matthey, Barnett, Ungerer, & Waters, 2000). Literature on postnatal PTSD symptoms is inconclusive, some studies indicated that PTSD symptoms reduce with time (Binder et al., 2011; Johnson, 2002). However, Shaw et al. (2009) indicated that symptoms may increase over time, consistent with the research on paternal postnatal depression. These conflicting results highlight the need for further research with regards to this. A delayed onset in fathers could possibly be due to fathers feeling a need to play a more supportive or protector role in the immediate period after the birth, potentially causing any of their own symptoms to be masked or to develop later. This could be related to the finding that men significantly used a more detached coping mechanism than women (Elklit et al., 2007).

2.6 Ethical Considerations

2.6.1 Ethical approval.

The study was reviewed and approved by the London-Fulham Research Ethics Committee via proportionate review and NNUH NHS Foundation Trust Research and Development department (Appendix O and P). No amendments to the proposed methodology were required. However, following commencement of the study approval for amendments were submitted and accepted. The first two were to alter the cut-off levels used in the GAD-7 and PHQ-9 (Appendix Q) and the cut-off levels in the IES-R (Appendix R) which would trigger a letter being sent to the participant to advise they seek support from

their GP (Appendix S). The final amendment (Appendix T) was to request that a final reminder letter (Appendix K) could be sent to participants who had consented to being contacted and had not returned their participant pack. This change was made due to the low participant numbers at this stage in the study and the hope that those who had consented to having the packs sent to them may still be willing to participate but had lost the original pack. Thus the final reminder letter was sent with a full participant pack. Details of recruitment efforts can be seen in Appendix A. This study was designed and carried out in accordance with the Good Clinical Practice guidelines set out by the National Institute for Health Research Clinical Research Network (2013) and the British Psychological Society's Code of Human Research Ethics (2014).

2.6.2 Informed consent.

Following consenting to being contacted by the chief investigator, participants were provided with a detailed participant information sheet (Appendix I and N) explaining the purpose of the research and what would be involved for those fathers who chose to participate. Fathers were given the opportunity to discuss the study with the chief investigator and ask any questions they may have had. Fathers recruited via the clinic (see 2.5.1.1) could address questions to the chief investigator in person. For those recruited via the postal method, email contact details of the chief investigator were provided.

Fathers were asked to complete a consent form to indicate they understood the details of the study, that they had the opportunity to ask any questions and that they had the right to withdraw. Best practice guidelines stipulate that participants should have at least 24 hours between receiving the participant information and being asked for consent. In the case of the clinic, fathers were given the opportunity to participate there and then, which is against best practice guidelines. However, it was ensured that they had time to ask questions before

consent was obtained and measures administered. It was ensured they would have time to consider whether they would like to participate and they were given the option to take the participant pack home to fully consider participation. It was felt that for fathers attending the clinic they may prefer to complete the pack then and there for convenience and hence why this option was offered. They had the opportunity to withdraw at any point. This methodology was approved by the ethics committee. Only one father elected to complete the measures at their infant's clinic appointment, the remainder took the packs home for consideration. The use of reminder letters in this study should not have placed undue pressure on prospective participants to take part in the study because it was made clear that participation was optional. Reminders are often appreciated by many who may wish to take part but have simply forgotten to complete the questionnaire.

2.6.3 Risks and burdens.

There was a small risk that questionnaire completion during the study may have caused some fathers distress, however previous research using similar questionnaires had not encountered difficulties (Åhlund et al., 2009). It was made clear on the information sheet that participants should stop completing the questionnaires if they were experiencing distress. The information sheet contained information for participants to access appropriate support as required, including signposting to relevant charitable organisations and to their GP should they have felt they needed to discuss particular issues or seek further support. For fathers who chose to complete the questionnaires in the clinic, the chief investigator, a trainee clinical psychologist (supervised by a chartered clinical psychologist), was available to support participants who became distressed during completion of the questionnaires. Additionally, the Bliss Family Care Coordinator was available to contact to provide support in the immediate situation if this was required.

There was an associated burden with participating in this study in terms of the time needed to complete questionnaires. However, this time commitment was clearly stated in the participant information sheet and participants were free to withdraw from completing the questionnaires at any time.

2.6.4 Management of reported PTSS, depression and anxiety reaching clinical levels.

If a participant's responses indicated high levels of psychological distress by exceeding the clinical cut-off for the measures (scores on IES-R ≥ 33 , PHQ-9 and GAD-7 ≥ 15), the chief investigator contacted the participant via letter (Appendix S) to recommend they seek advice from their GP for further support. This procedure was made explicit in the participant information sheet so participants could make an informed choice about whether or not they wanted to participate. The chief investigator visited the UEA on a regular basis during the study period to collect returned questionnaire packs. This ensured they were scored in a timely fashion and aided identification of potentially high scoring participants.

2.6.5 Confidentiality.

As detailed in section 2.5.1 and 2.5.2, each participant was given a unique study number at the point of identification. This enabled the participants to be pseudo-anonymised. Consent forms and identifiable information were securely stored separately from questionnaire responses to maintain the confidentiality of respondents. The chief investigator only obtained identifiable information of participants who consented to being contacted by them. The code enabled the chief investigator to match questionnaire responses and demographic information for participants without them being identified in the data analysis process. The code was also used to identify participants who scored above clinical cut-off

thresholds as detailed in section 2.6.4 so that a letter could be sent to them advising them to visit their GP. This information was not passed onto the GP by the researcher and participants were informed of this in the information sheet and thus limits were set on the extent of confidentiality.

2.6.6 Data storage.

Consent forms were stored securely in a locked cabinet and separately from questionnaire responses at the UEA. Questionnaire packs were safely stored during the process of scoring and data entry. All data stored electronically were password protected and transferred by means of an encrypted memory stick when required. The storage and management of data was conducted in accordance with the Data Protection Act (1998). Data from this study will be securely stored at the UEA for 10 years following the completion of the study before being destroyed in line with the University's procedures.

2.7 Plan for Analysis

Data were entered into the Statistical Package for Social Science (IBM SPSS, Version 22) and were analysed using this programme. Missing data on questionnaire measures were replaced using individual mean replacement where missing scores are replaced by the mean of the other completed scores. Histograms and statistical analyses were used to examine the data distribution to ascertain if assumptions of parametric testing would be met. Assumptions were violated and thus non-parametric tests were employed.

2.7.1 Research questions and planned analysis.

Descriptive analyses were planned to examine participant demographics and to calculate the percentage of fathers with PTSS, depression and anxiety symptoms. Research questions one and two were examined using independent Mann-Whitney tests to compare

fathers of VLBW infants and fathers of term infants on measures of PTSS and anxiety and depression. Research question three was examined using correlational analysis. The final research question was examined using independent Mann-Whitney tests to compare PTSS symptoms in fathers to those found in a published cohort of mothers (Åhlund et al., 2009).

Given the exploratory nature of the study, it was not known whether or not independent Mann-Whitney tests would find significant differences between VLBW and term fathers with respect to PTSS levels. Should the analyses show significant differences, it was anticipated that a series of correlational analyses would be conducted to explore whether there was an association between PTSS levels and infant demographic variables. Specifically it would be hypothesised that fathers whose infants remained in hospital for longer periods of stay may be more likely to exhibit PTSS due to increased exposure to the stressful hospital environment and that this may be an indication of increased severity of illness in the infant. Equally fathers with infants of lower birth weights and shorter gestational ages may be expected to have higher levels of PTSS due to the increased complications associated with both these factors. Thus these supplementary exploratory analyses were conducted to consider the findings in this particular sample and note any potential differences with previous research.

Chapter Three: Results

3.1 Chapter Overview

This chapter begins by outlining the analytical strategy used to explore the research questions, followed by a description of the preliminary analyses. The research questions are then explored in detail followed by further supplementary analyses and finally a summary of the main findings.

3.2 Analytical Strategy

In total, data were collected from 48 participants: 26 were in the VLBW group and 22 in the control term group. The variables of interest for the present study include: PTSS as measured by the IES-R, perceived social support as measured by the ESSI, symptoms of anxiety as measured by the GAD-7, and symptoms of depression as measured by the PHQ-9.

The distributions of the data were examined prior to data analysis to determine whether they met the assumptions of normality and homogeneity of variance. Histograms were plotted for each group to provide a visual representation of each variable (see Appendix U). Some of the data were found to violate the assumptions of normality and homogeneity of variance (full details are in section 3.2.1). Descriptive statistics were conducted for all variables of interest and internal consistency was examined for each scale. Research questions one, two and four were examined using independent samples tests and question three was examined using correlational analysis.

Given the sample size in this study and the violations of assumptions of normality and homogeneity of variance of the data in addition to the unequal group sizes, non-parametric statistical methods were deemed a robust and appropriate method of answering the research questions. As the data violated many of the assumptions, parametric testing was not appropriate. Given that the analysis plan for this study involved comparing the data with that of maternal data gathered in another study where non-parametric testing was used (Åhlund et al., 2009) it was decided to use the same statistical procedures with this study's data to enable more meaningful comparisons to be made.

All analyses were conducted using two-tailed tests. Data were analysed using SPSS (IBM, Version 22). When interpreting SPSS outputs for Mann-Whitney tests the exact significance (two-tailed) row was consulted over the asymptomatic significance row as this is

recommended for small sample sizes (Field, 2009). Scatterplots (see Appendix V) were examined for each variable to be used in planned correlational analyses in order to check the relationships were linear before the correlational analyses were performed. Discussion of these relationships can be seen in section 3.4.4 and 3.4.6 in relation to specific questions.

3.2.1 Data preparation.

3.2.1.1 Distribution of data.

In order to perform parametric statistical analysis, data are required to meet four assumptions: (a) data are normally distributed, (b) data have homogeneity of variance, (c) data are measured at least at the interval level, and (d) data are independent (Field, 2009). Histograms were plotted to inspect the shape of the distributions (Appendix U). Visual inspections suggested that the data for the main outcome variables were not normally distributed. To assess this further skewness (symmetry of the distribution) and kurtosis (degree to which scores cluster in the tail of a frequency distribution) values were converted to z scores and examined. If a z score falls below 1.96 it can be assumed to meet parameters for parametric statistical testing. The z scores for the main outcome measure (IES-R) for VLBW fathers were; $z = 3.15$ (skewness) and $z = 2.24$ (kurtosis), and for term fathers they were $z = 6.65$ (skewness) and $z = 12.8$ (kurtosis). All these scores were significantly different from normal. Additionally, a number of the other outcome variables were skewed, indicating violations of normality (see Appendix W for skewness and kurtosis values for all variables).

Due to the mix of results from the Skewness and Kurtosis values across variables, with some indicating the variables were normally distributed, the Shapiro-Wilk test (W) was used to examine further whether the distribution of the data on the main variables deviated from normality. This test compares sample scores to a normally distributed set of scores with the same mean and standard deviation. A non-significant value ($p > .05$) indicates a normal

distribution. In this study, the scores on the PTSS measure were significantly different from a normal distribution for both the VLBW group, $W(26) = 0.85, p = .001$ and the term group, $W(22) = 0.56, p < .001$. Likewise, the scores on measures of anxiety (VLBW group, $W(26) = 0.85, p = .002$ and term group, $W(22) = 0.88, p = .014$) and depression (VLBW group, $W(25) = 0.87, p = .005$ and term group, $W(22) = 0.75, p < .001$) were significantly different from a normal distribution. The scores on the social support measure for the VLBW group were significantly different from a normal distribution, $W(26) = 0.92, p = .04$, however for the term group the scores were normally distributed, $W(22) = 0.96, p = .52$. These results indicated that the main variables violated the assumption of normal distribution.

Homogeneity of variance was assessed for all variables using Levene's test which tests the null hypothesis that the variances in the different groups are equal. If Levene's test is significant at $p \leq .05$ it indicates that the variances are significantly different and thus the assumption of homogeneity of variance is violated. The variances between the two groups were significantly different for the main outcome variable of the IES-R, $F(1, 46) = 19.71, p < .001$, and the PHQ-9, $F(1, 45) = 4.35, p = .043$, and thus the assumption of homogeneity of variances were violated for these variables. For the other main variables the variances were equal; for the ESSI, $F(1, 46) = 0.018, p = .89$, and for the GAD-7, $F(1, 46) = 1.25, p = .27$.

Due to the criteria for the use of parametric tests for the main PTSS variable, along with a number of criteria for each main outcome variable being violated and the additional difficulty in unequal group sizes, non-parametric tests were used in this analysis. The non-parametric Mann-Whitney (U) test was chosen to examine differences between variables. The non-parametric test Kendall's Tau (τ) was chosen to analyse correlations between the measure of social support and psychological outcome measures. Kendall's Tau was chosen over Spearman's rho because it is recommended for small data sets (Field, 2009) and is suggested to be a better estimate of the correlation in the population (Howell, 1997).

3.2.1.2 Missing data.

Missing data were replaced by the individual mean score on each measure (or the subscale mean where appropriate) where the mean of completed items is used to replace missing items. This method has been shown to be an appropriate method for dealing with missing data (Shrive, Stuart, Quan, & Ghali, 2006). It can be specified that mean replacement is only done if a certain number of items in a scale are completed in total. However, due to the small data set and the impact using this criterion would have had on the total number of IES-R scores available for analysis it was decided that a minimum value would not be set. In one case (3.8%) in the VLBW group, data for an entire questionnaire, the PHQ-9, were missing which can be seen by the *n* values in Table 5. Table 6 details the number of participants missing particular items on each measure, the percentage of missing data was relatively small.

Table 5

Sample Sizes for Each Questionnaire

	VLBW				Term			
	IES-R	ESSI	GAD-7	PHQ-9	IES-R	ESSI	GAD-7	PHQ-9
<i>n</i>	26	26	26	25	22	22	22	22
Missing	0	0	0	1	0	0	0	0
Questionnaires								

Table 6

Number of Participants with Missing Data for Each Questionnaire

	VLBW				Term			
	IES-R	ESSI	GAD-7	PHQ-9	IES-R	ESSI	GAD-7	PHQ-9
<i>n</i>	26	26	26	25	22	22	22	22
1-10% missing	1	0	0	0	2	0	0	0
10-20% missing	1	0	0	1	0	0	0	0
20-30% missing	2	0	0	0	0	0	0	0

It was decided to include all participants in the analysis, including those who had missing data. This maximised the sample size for the study.

3.3 Descriptive Statistics

Participant demographic statistics are presented in section 2.2.4. This section presents further descriptive statistics of the fathers and infants in the sample and makes comparisons between the two groups. Following this, demographic statistics in relation to labour and hospitalisation are detailed and finally descriptive statistics for the main variables are presented.

3.3.1 Participant demographics for fathers.

In total 49 fathers participated in the research study; 26 fathers of VLBW infants and 23 fathers of term infants. One participant in the term group was excluded from analysis due to an incomplete consent form, though efforts were made to gain this consent form prior to

this decision. Therefore 48 participants made up the sample for analysis; 26 in the VLBW group and 22 in the term group (see Appendix A for recruitment efforts). One participant in the term group did not return their demographic questionnaire and thus for the following demographic statistics the VLBW group $n = 26$ and the term group $n = 21$.

Fathers indicated their age using six different age categories (see section 2.2.4). In the VLBW group fathers' ages ranged from 30 to over 50 and in the term group they ranged from 25 to over 50. A Kruskal-Wallis test was conducted to ascertain whether there were any statistically significant differences in IES-R scores, indicating PTSS, between age groups. There were no significant differences in the IES-R scores across the six different age categories for the VLBW group ($H = 2.49(4)$, $p = .65$) nor the term group ($H = 4.39(5)$, $p = .49$).

In Table 7 data are presented regarding participants pre-birth mental health difficulties. Fathers did not report mental health difficulties other than anxiety or depression prior to the birth of their infant. A Kruskal-Wallis test was conducted to ascertain whether there was a statistical significant difference between the pre-birth mental health difficulties experienced by fathers in the VLBW versus the term group. There were no significant differences in pre-birth mental health difficulties across the four categories between the two groups, $H = 3.08(3)$, $p = .38$.

Table 7

Pre-Birth Mental Health Data

Mental Health Difficulty	VLBW ($n = 25$)	Term ($n = 21$)
	<i>Missing $n = 1$</i>	<i>Missing $n = 1$</i>
Depression	3 (11.5%)	4 (18.2%)
Anxiety	0 (0.0%)	1 (4.5%)
Depression & Anxiety	0 (0.0%)	1 (4.5%)
No Pre-Birth Mental Health Difficulty	22 (84.6%)	15 (68.2%)

3.3.2 Participant demographics for infants.

There was one set of twins in the VLBW group, but no twins in the term group. This resulted in the infant sample sizes being $n = 27$ for the VLBW group and $n = 22$ for the term group. The statistics for infant age have been reported in weeks for accuracy in statistical tests. There was no significant difference in the length of time postpartum (weeks) in which questionnaires were completed by fathers of the VLBW infants ($Mdn = 170$) and the term infants ($Mdn = 187$), $U = 211$, $z = -1.74$, $p = .083$.

3.3.2.1 Characteristics of labour and hospital admission.

All term infants had a normal vaginal delivery (NVD) birth and were not admitted to the NICU. This section gives details of the labour and hospital admission for the VLBW group ($n = 27$). The majority of VLBW infants were born via emergency section ($n = 18$, 66.7%), six (22.2%) had a NVD birth and the remaining had a NVD with forceps ($n = 1$, 3.7%) or a vaginal breech ($n = 2$, 7.4%). Data for length of hospital stay, which incorporates

the stay in all areas of care, were only obtained for infants' inpatient stay at the NNUH NICU. The mean length of total stay was 48.4 days ($SD = 31.4$). The mean stay in ITU was 13.6 days ($SD = 15.7$), in HDU it was 15.5 days ($SD = 16.5$) and in special care it was 19.3 days ($SD = 15.4$). Approximately 25% of all VLBW babies cared for at the NNUH are repatriated to referral units (P. Clarke, personal communication, June 1, 2016). Data were not obtained for this study with respect to the numbers of infants in the sample that were repatriated. Thus there are no data on the length of time these infants may have remained in a different hospital and therefore data for these infants' complete length of hospital stay may be incomplete. This is further discussed in section 4.4.2.4.

3.3.4 Descriptive statistics for measures.

Descriptive statistics for the main variables are presented here. The median is presented in addition to the mean as the median is a measure of central tendency which is relatively unaffected by skewed distributions (Field, 2009).

3.3.4.1 The Impact of Events Scale-Revised (IES-R).

Descriptive statistics for the IES-R total and subscales are presented in Table 8. The mean score on the IES-R for fathers of VLBW infants was 18.1 ($SD = 18.6$). Means on the intrusion, avoidance and hyperarousal subscales for this group were 7.38 ($SD = 7.16$), 7.47 ($SD = 8.29$), and 3.23 ($SD = 5.07$) respectively. For fathers of term infants the mean total IES-R score was 2.37 ($SD = 4.72$). Means on the intrusion, avoidance and hyperarousal subscales for the term group were 1.51 ($SD = 3.49$), 0.32 ($SD = 0.72$), and 0.55 ($SD = 1.34$) respectively. Creamer et al. (2003) suggest that a score of 33 or above on this measure indicates a "probable diagnosis of PTSD", however it has been suggested that scores above 24 indicate that PTSD is a "clinical concern" (Asukai et al., 2002). In the VLBW group 7.7% ($n = 2$) scored 24 or above indicating PTSD as a clinical concern and 19.2% ($n = 5$) scored 33

or above indicating a probable PTSD diagnosis. No fathers in the term group scored above 24 and thus PTSD was not a concern for any participants in this group.

Table 8

Descriptive Statistics for IES-R Scores

	Possible Range	Mean (SD)	Score Range	Median	Mean (SD)	Score Range	Median
	VLBW (<i>n</i> = 26)				Term (<i>n</i> = 22)		
IES-R Total	0-88	18.1 (18.6)	0-74	12.5	2.37 (4.72)	0-21	0.5
Intrusion Subscale	0-32	7.38 (7.16)	0-26	6.70	1.51 (3.49)	0-16	0.0
Avoidance Subscale	0-32	7.47 (8.29)	0-27	4.67	0.32 (0.72)	0- 2	0.0
Hyperarousal Subscale	0-24	3.23 (5.07)	0-21	0.50	0.55 (1.34)	0- 5	0.0

In this study Cronbach's alpha for the total scale and subscales on the IES-R were excellent, suggesting high internal consistency of the measure: total scale $\alpha = .96$; intrusion subscale $\alpha = .93$; avoidance subscale $\alpha = .94$; hyperarousal subscale $\alpha = .85$. This compares with the internal consistency reported by Creamer et al., (2003) of: total scale $\alpha = 0.96$; intrusion subscale $\alpha = 0.94$; avoidance subscale $\alpha = 0.87$; and hyperarousal subscale $\alpha = 0.91$.

3.3.4.2 The ENRICHD Social Support Inventory (ESSI).

Descriptive statistics for the ESSI are provided in Table 9. Higher scores on this measure, indicate higher perceived social support (Vaglio et al., 2004). Scores on the ESSI for VLBW fathers (*Mdn* = 28) did not differ significantly from those reported by term fathers (*Mdn* = 24), $U = 225$, $z = -1.26$, $p = .21$.

Table 9

Descriptive Statistics for ESSI Scores

	Possible	Mean	Score	Median	Mean	Score	Median
	Range	(SD)	Range		(SD)	Range	
		VLBW (<i>n</i> = 26)			Term (<i>n</i> = 22)		
ESSI	8-34	26.2 (6.46)	13-34	28.0	23.8 (6.67)	10-34	24.0

The internal consistency for the ESSI in this study was good with Cronbach's $\alpha = .88$, which matches the internal consistency for the ESSI reported by Vaglio et al. (2004). However, when exploring for each item on the scale what would happen to the alpha value if the item was deleted, this revealed that if item 7 ("Were you married or living with a partner?") was deleted the alpha was greater than the overall alpha reported. This therefore means that deleting this item improves reliability (Field, 2009). When Item 7 was removed Cronbach's α for the ESSI was .90, thus demonstrating higher internal consistency. These findings are consistent with those reported by Mitchell et al. (2003) of a 7-item scale of $\alpha = .86$. They found the standardised coefficient alpha improved when both items 4 and 7 were removed, giving a 5-item scale α of .87. These findings suggest that the ESSI scale had greater internal consistency in the current study, see section 4.4.1 for further discussion.

3.3.4.3 The GAD-7.

Descriptive statistics for the GAD-7 are provided in Table 10. In the VLBW group the mean reported score on the GAD-7 was 3.35 ($SD = 3.58$) and for the term group it was 4.32 ($SD = 3.37$). The recommended cut-offs suggested by Spitzer et al. (2006) for the GAD-7 are; scores of five to nine indicate mild anxiety, 10 to 14 indicate moderate anxiety, and scores over 15 indicate severe anxiety. In the VLBW group 34.6% ($n = 9$) scored in the mild

range and 3.8% ($n = 1$) scored in the moderate range. No fathers in this group scored in the severe range. In the term group 36.4% ($n = 8$) scored in the mild range and 4.5% ($n = 1$) scored in the severe range. No fathers in this group scored in the moderate range.

Table 10

Descriptive Statistics for GAD-7 Scores

	Possible Range	Mean (SD)	Score Range	Median	Mean (SD)	Score Range	Median
	VLBW ($n = 26$)				Term ($n = 21$)		
GAD-7	0-21	3.35 (3.58)	0-13	2.00	4.32 (3.37)	0-15	4.00

Cronbach's alpha revealed a high internal consistency for this measure in the current study, $\alpha = .81$ which is within the range of $\alpha = .79$ -.91 reported by Dear et al. (2011).

3.3.4.4 The Patient Health Questionnaire-Nine (PHQ-9).

Descriptive statistics for the PHQ-9 are provided in Table 11. In the VLBW group the mean reported score on the PHQ-9 was 2.16 ($SD = 2.21$) and for the term group it was 4.59 ($SD = 4.81$). Kroenke and Spitzer (2002) recommend the following cut-offs on the PHQ-9; scores of five to nine indicate mild depression, scores of 10 to 14 indicate moderate depression, scores of 15 to 19 indicate moderately-severe depression, and scores above 20 indicate severe depression. In the VLBW group 11.5% ($n = 3$) scored in the mild range and no participants scored above ten. There was no moderate to severe depression found in this group. This compared with 13.6% ($n = 3$) in the term group scoring in the mild range, 4.5% ($n = 1$) scoring in the moderate range, and 9.1% ($n = 2$) scoring in the moderate-severe range. None of the fathers' scores in the term group fell in the severe range.

Table 11

Descriptive Statistics for PHQ-9 Scores

	Possible	Mean	Score	Median	Mean	Score	Median
	Range	(SD)	Range		(SD)	Range	
	VLBW (<i>n</i> = 25)				Term (<i>n</i> = 21)		
PHQ-9	0-27	2.16 (2.21)	0-8	2.00	4.59 (4.81)	0-18	3.00

In this study the internal consistency for the PHQ-9 was excellent: $\alpha = .83$ which was the same as reported in study of patients referred by their GP to mental health workers of $\alpha = .83$ (Cameron et al., 2008).

3.4 Results Relating to Research Questions

3.4.1 Section overview.

The primary research questions focus on comparing fathers of VLBW infants and those of term infants for the presence of PTSS and other psychological factors. A supplementary question related to the relationship of perceived social support and psychological symptoms in fathers of VLBW infants. A final question considered the difference between reported PTSS in fathers and mothers by comparing the data from this study with that from a maternal data set (Åhlund et al., 2009).

3.4.2 Research question 1: Is there a difference in the levels of PTSS in fathers of VLBW infants and fathers of term infants two to four years postpartum?

In order to explore this question, a Mann-Whitney (*U*) test was conducted to compare fathers' scores on the IES-R in the two groups. Fathers of VLBW infants (*Mdn* = 12.5) had

significantly higher scores on the IES-R total scale than fathers of term infants ($Mdn = 0.50$), $U = 80.0$, $z = -4.31$, $p < .001$. Fathers of VLBW infants scored significantly higher on the intrusion and avoidance subscales, however the two groups did not differ significantly on their scores on the hyperarousal scale. The test statistics for the individual subscales can be viewed in Table 12.

Table 12

Mann-Whitney Test Statistics for the IES-R Subscales

	Median		U	z	p
	VLBW	Term			
IES-R Total Score	12.5	0.00	80.0	-4.31	< .001
IES-R Intrusion Scale	6.70	0.00	99.5	-3.94	< .001
IES-R Avoidance Scale	4.67	0.00	103.0	-4.09	< .001
IES-R Hyperarousal Scale	0.50	0.00	185.0	-2.45	.014

3.4.3 Research question 2: Is there a difference in the levels of anxiety and depression in fathers of VLBW infants and fathers of term infants two to four years postpartum?

To reduce the likelihood of Type I errors, that is, the likelihood of spuriously finding significant results due to multiple comparisons, the Bonferroni adjustment was used for this research question (Field, 2009). This was because two independent sample t -tests were performed using the same dependent variable. Mann-Whitney (U) tests were conducted on PHQ-9 and GAD-7 scores to explore this question. The adjusted critical alpha value was determined using the calculation: $.05/2 = .025$. Therefore any test where $p < .025$ was

considered significant. When using the adjusted alpha, anxiety levels as measured by the GAD-7 in VLBW fathers ($Mdn = 2.00$) did not differ significantly from those reported by term fathers ($Mdn = 4.00$) at two to four years postpartum, $U = 228$, $z = -1.22$, $p = .23$. When comparing reported depression levels, as measured by the PHQ-9, between the two groups of fathers the difference between VLBW fathers' scores ($Mdn = 2.00$) and term fathers' scores ($Mdn = 3.00$) at two to four years postpartum was not significant, $U = 179$, $z = -2.08$, $p = .037$. However, if the test is assessed against the unadjusted critical alpha value of .05, this suggests a significant difference between the groups, with fathers of term infants reporting higher levels of depression than fathers of VLBW infants. This would indicate that the difference between the two groups in depression scores was approaching significance. A difference which was in the opposite direction of that observed in PTSS levels, where fathers in the VLBW group scored higher. Given the comorbidity of depression and PTSS it would be expected that the VLBW group would be showing slightly elevated depression levels. The results indicate that there may be slightly higher levels of depression in the term group, however, this has not reached significance when the Bonferroni adjustment has been applied and thus caution is required in interpretation. It would have been expected that anxiety levels would have been different in the two groups with the expectation this would have mirrored the differences observed in PTSS levels in the two groups considering the comorbidity of PTSS and anxiety conditions. Implications of these results will be discussed further in section 4.2.2.

3.4.4 Research question 3: In fathers of VLBW infants, is there a relationship between levels of perceived social support at the time of the birth and hospitalisation of their infant and levels of PTSS, anxiety and depression two to four years postpartum?

Visual inspection of the scatterplots (Appendix V) depicting the associations between the measure of perceived social support, ESSI, and measures of PTSS, anxiety and depression (IES-R, GAD-7, PHQ-9) for fathers of VLBW infants suggested linear relationships existed between these variables but with very weak correlations as there were a number of outliers in all relationships. The correlation for ESSI and IES-R scores was $\tau = -.31$; for ESSI and GAD-7 scores it was $\tau = -.08$ and for ESSI and PHQ-9 scores it was $\tau = -.19$.

Kendall's Tau (τ) was employed to investigate further these relationships between VLBW fathers' perceived social support at the time of the birth and hospitalisation of their infant and their PTSS, anxiety and depression levels at two to four years postpartum. Table 13 reports the correlation coefficients and significance levels for these associations. Cases were excluded pairwise and the total number of participants in this analysis was 26 as this analysis was conducted on only the VLBW group.

For the correlational analysis between PTSS levels and perceived social support the usual critical alpha value of .05 was used as IES-R scores were a primary measure. For the correlational analyses exploring GAD-7 and PHQ-9 scores with perceived levels of social support a Bonferroni adjustment was applied as these were secondary measures. There were two correlations performed using the same dependent variable. The adjusted alpha level is determined using the calculation: $.05/2 = .025$. Therefore any test where $p < .025$ is considered significant.

Table 13

Correlation Matrix of ESSI and the IES-R, GAD-7 and PHQ-9 for VLBW Group (n = 26)

			ESSI
Kendall's Tau (τ)	IES-R Total	Correlation Coefficient	-.314
		Sig. (2-tailed)	.029*
	GAD-7	Correlation Coefficient	-.084
		Sig. (2-tailed)	.573
	PHQ-9	Correlation Coefficient	-.191
		Sig. (2-tailed)	.217

* Correlation is significant at the .05 level (2-tailed).

The relationship between perceived social support and PTSS was significant, $\tau = -.31$, $n = 26$, $p = .029$, for fathers of VLBW infants low levels of perceived social support at the time of the birth and hospitalisation of their infant was associated with higher PTSS two to four years postpartum. The relationships between perceived social support and depression levels and perceived social support and anxiety levels were not significant when either the adjusted alpha (.025) or unadjusted alpha (.05) were used, $\tau = -.19$, $n = 26$, $p = .28$ and $\tau = -.084$, $n = 26$, $p = .57$. These results suggest that fathers of VLBW infants perceived level of social support is associated with the levels of PTSS that they report but not reported levels of anxiety and depression. These findings will be discussed in section 4.2.3.

3.4.5 Research Question 4: How does PTSS in fathers of VLBW infants compare to PTSS in mothers of VLBW infants two to four years postpartum?

This question was addressed by comparing the data from this study with the data collected by Åhlund et al. (2009). The raw data from the latter study were provided by the original authors which enabled full testing to be performed. There was an inconsistency between the number of participants reported in the term mothers' group in the published paper ($n = 22$) and the data available in the raw data set ($n = 13$). This was presumed to be an error in the write-up of the study (P. Clarke, personal communication, April 20; see Appendix X). This is supported by the observation that the statistical results obtained through tests being re-run on the raw data were the same as those that were reported in the published paper. After combining the samples from the two studies, the total VLBW group consisted of 50 parents (24 mothers and 26 fathers) and the total term group consisted of 35 parents (13 mothers and 22 fathers). Mann-Whitney tests were conducted on the mothers and fathers data to investigate comparisons and differences.

Unfortunately raw data were not available for the length of time postpartum at which questionnaires were completed for the mothers' study. A measure of central tendency of the length of time postpartum was also not provided in the published paper of the mothers' study, therefore it is only known that mothers were questioned at some point between two and three years postpartum (Åhlund et al., 2009). Thus it was not possible to compare these data with that obtained for fathers. Further discussion of this will be considered in section 4.2.4.

There were no missing IES-R questionnaires for the mothers, but some questionnaires had data points missing. Total scores were calculated by skipping missing data. This was the chosen method for this data, rather than using individual mean replacement as was used for the fathers' data, because it became apparent this was how the authors had originally

calculated the scores which they reported in their paper (Åhlund et al., 2009). Had individual mean replacement been used then the current study would have reported data inconsistent with that reported in the mothers' study. Table 14 gives details of the missing data for mothers on the IES-R.

Table 14

Number of Mothers with Missing Data on the IES-R

	1-10% missing	10-20% missing	20-30%
VLBW ($n = 24$)	1	1	2
Term ($n = 13$)	1	1	0

In the VLBW mothers group 41.7% ($n = 10$) scored 24 or above indicating PTSD as a clinical concern and 16.7% ($n = 4$) scored 33 or above indicating a probable PTSD diagnosis. No mothers in the term group scored above 24 and thus PTSD was not a concern for any participants in this group. These data are compared with the fathers' data in Table 15.

Table 15

Percentages of Fathers and Mothers Meeting PTSD Cut-off Scores on the IES-R

	VLBW		Term	
	Fathers	Mothers	Fathers	Mothers
	(<i>n</i> = 26)	(<i>n</i> = 24)	(<i>n</i> = 22)	(<i>n</i> = 13)
Percentage Scoring in the Clinical Concern Range	7.7%	41.7%	0%	0%
Percentage Scoring the Probable Diagnosis Range	19.2%	16.7%	0%	0%

PTSS levels reported in VLBW mothers (*Mdn* = 25.0) at two to three years postpartum did not differ significantly from those reported in VLBW fathers (*Mdn* = 12.5) at two to four years postpartum, $U = 222$, $z = -1.76$, $p = .079$. Reported PTSS also did not differ significantly between term mothers (*Mdn* = 0.00) and term fathers (*Mdn* = 0.00), $U = 137$, $z = -.22$, $p = .84$. There were no significant differences between mothers and fathers across the two groups on the avoidance or hyperarousal subscales of the IES-R. There was a significant difference between mothers (*Mdn* = 11.5) and fathers (*Mdn* = 6.7) on the intrusion subscale of the IES-R in the VLBW group, $U = 199$, $z = -2.21$, $p = .027$, with mothers scoring significantly higher than fathers on this subscale. However, in the term group there were no significant differences between mothers and fathers. Further, there were no significant differences in birth weight or gestational age for the infants in the two groups. In the VLBW group there was no significant difference in the length of overall hospital stay between

mothers' and fathers' infants. However, the length of time fathers' infants stayed in ITU and HDU was significantly longer than for mothers' infants though mothers' infants stayed in Special Care significantly longer than fathers' infants. The test statistics for all these variables can be seen in Table 16. Overall, the results indicate that fathers of VLBW infants report similar levels of PTSS two to four years postpartum as mothers of VLBW infants do two to three years postpartum.

Table 16

Mann-Whitney Test Statistics for Mother-Father Comparisons

	Median		<i>U</i>	<i>z</i>	<i>p</i>
	Mothers	Fathers			
	VLBW				
IES-R Total Scale	25.0	12.5	223.0	-1.73	.085
IES-R Intrusion Scale	11.5	6.7	198.5 *	-2.21	.027
IES-R Avoidance Scale	7.5	4.7	277.5	-0.67	.51
IES-R Hyperarousal Scale	2.5	0.5	224.0	-1.75	.081
Birth Weight (grams)	1120.2	1055.0	307.0	-0.10	.93
Gestational Age (days)	211.0	196.0	221.5	-1.76	.08
Days Infant in Hospital	46.0	45.0	311.5	-0.01	.10
Days Infant in ITU	2.5	6.5	175.5*	-2.67	.007
Days Infant in HDU	1.5	15.0	177.0*	-2.66	.007
Days Infant in Special Care	38.0	21.0	156.5*	-3.02	.002
	Term				
IES-R Total Scale	0.00	0.5	137.0	-0.22	.84
IES-R Intrusion Scale	0.00	0.00	131.0	-0.46	.67
IES-R Avoidance Scale	0.00	0.00	138.5	-0.22	.99
IES-R Hyperarousal Scale	0.00	0.00	129.5	-0.63	.65
Birth Weight (grams)	3450.0	3592.5	96.0	-0.96	.36
Gestational Age (days)	280.0	277.5	117.5	-0.13	.90

*Significant at the .05 level (2-tailed).

3.4.6 Supplementary analysis comparing PTSS levels in parents of VLBW infants and parents of term infants two to four years postpartum

Further additional analyses were conducted on the mothers and fathers data combined to assess whether differences would be shown in the data between parents of VLBW infants and parents of term infants combined. By combining the mothers and fathers data the group for parents of VLBW infants ($n = 50$) and for parents of term infants ($n = 35$) were compared. Mann-Whitney tests were performed to assess the difference between PTSS levels, as measured by the IES-R, between the two groups of parents. There was a significant difference between IES-R scores for VLBW parents ($Mdn = 20.5$) and for term parents ($Mdn = 0.00$), $U = 146$, $z = -6.56$, $p < .001$. Parents of VLBW infants report significantly higher levels of PTSS two to four years postpartum than parents of term infants. This significant difference was maintained for all subscales of the IES-R. Intrusion subscale scores were significantly higher for VLBW parents ($Mdn = 8.00$) than term parents ($Mdn = .0.00$), $U = 190$, $z = -6.19$, $p < .001$. Avoidance subscale scores were significantly higher for VLBW parents ($Mdn = 6.50$) than term parents ($Mdn = 0.00$), $U = 243$, $z = -5.91$, $p < .001$. Finally hyperarousal subscale scores were also significantly higher for VLBW parents ($Mdn = 2.00$) than for term parents ($Mdn = 0.00$), $U = 435$, $z = -4.39$, $p < .001$.

3.4.7 Supplementary correlational analyses exploring relationship between PTSS and infant demographic variables for the VLBW group.

Previous research is inconsistent in terms of infant demographic variables which may have an association with the development of PTSS in fathers (e.g., Elklit et al., 2007; Mackley et al., 2010). For this analysis for the one father whose children are twins, his child of lowest birthweight was chosen as putting both twins' demographic data was likely to affect the analyses conducted. The difference in weight between these two children was only 26

grams, with the slightly heavier one spending two extra days in ITU and two less days in special care than the slightly lighter infant; their total hospital stay was identical. It was felt that the differences in the demographic data between these two infants was not significant enough to adversely affect the results if one child's data was chosen over another. Scatter plots (Appendix V) were examined to explore relationships between PTSS levels in fathers in the VLBW group and the infant demographic variables of: infant age (weeks), birth weight, birth gestational age, length of hospital stay, and length of stay in ITU, HDU and Special Care. The scatterplots suggested a potential moderate relationship between the infants' age and fathers reported PTSS levels, $\tau = -.37$. Other variables appeared to have very weak associations or no associations. Kendall's Tau (τ) was used to explore the associations statistically; cases were excluded pairwise. Due to the multiple comparisons a Bonferroni correction was applied to reduce the likelihood of Type I errors. There were 7 independent variables compared with the dependent variable and thus the calculation for the adjusted alpha was: $.05/7 = .007$. Therefore any tests with a statistical significance of $p = < .007$ would indicate a significant correlation between the variables. Table 17 displays the correlation matrix showing the associations between VLBW infant demographic variables and their fathers' levels of PTSS.

Table 17

Correlation Matrix of Fathers' PTSS Levels with Infant Demographic Variables (n = 26)

			IES-R Total
Kendall's Tau (τ)	Age of Infant (weeks)	Correlation Coefficient	-.37*
		Sig. (2-tailed)	.008
	Infant Birth Weight (grams)	Correlation Coefficient	-.10
		Sig. (2-tailed)	.48
	Infant Gestational Age (days)	Correlation Coefficient	-.053
		Sig. (2-tailed)	.84
	Length of Hospital Stay (days)	Correlation Coefficient	-.028
		Sig. (2-tailed)	.84
	Length of Stay in ITU (days)	Correlation Coefficient	.14
		Sig. (2-tailed)	.33
	Length of Stay in HDU (days)	Correlation Coefficient	-.074
		Sig. (2-tailed)	.61
	Length of Stay in Special Care (days)	Correlation Coefficient	-.019
		Sig. (2-tailed)	.89

* Correlation is significant at the unadjusted .05 level (2-tailed).

None of the correlations were significant when the adjusted alpha criterion of .007 was applied. However the correlation between IES-R scores and age, $\tau = -.37$, $n = 26$, $p = .008$, was very close to significance and when the unadjusted alpha of .05 was applied this would indicate a potential negative correlation between IES-R scores and age where fathers of VLBW infants report less PTSS as the length of time postpartum increases. Without the

Bonferroni correction though it is likely that this potential correlation reflects a Type I error, that a significant finding has been spuriously found. The results suggest that infant demographic variables such as birth weight and hospital stay, which could be considered an indirect measure of infant illness severity, are not associated with reported levels of PTSS in fathers of VLBW infants. This is consistent with some previous research (Mackley et al., 2010) and implications will be discussed further in section 4.2.1.1.

3.5 Chapter Summary

The data were analysed using non-parametric statistics to determine differences between groups and for correlational analyses as the criteria for parametric analyses were not met. Twenty-six fathers of VLBW infants and 22 fathers of term infants took part in the research and the mean length of time postpartum was 3.40 years and 3.76 years respectively. The analyses identified 26.9% of fathers of VLBW scored above cut-offs on the IES-R indicating PTSS as a clinical concern or probable diagnosis; no fathers of term infants met clinical cut-offs on this measure. There was a significant difference between the two groups in their reported levels of PTSS, with the VLBW group reporting higher levels. There was no significant difference between the two groups in terms of their anxiety levels or their depression levels when the Bonferroni adjustment was applied. In fathers of VLBW infants perceived levels of social support were found to correlate with PTSS levels but not anxiety or depression levels. When comparing the data from the current study with data from a maternal sample (Åhlund et al., 2009) it was found that levels of PTSS in fathers of VLBW infants did not differ significantly from those found in mothers of VLBW infants.

Chapter Four: Discussion

4.1 Chapter Overview

This final chapter provides a discussion of the results of this study. Firstly a summary of the results is given followed by an examination of them in relation to each of the research questions; comparisons are drawn with existing literature and previous research. The clinical implications of the findings are then discussed. This is followed by a methodological critique with consideration of the strengths and limitations of the study and then theoretical implications and areas of future research in the field are discussed. Finally, an overall conclusion is provided.

4.2 Summary of Research Questions

This study set out to explore the differences in PTSS at two to four years postpartum between fathers of VLBW infants and fathers of healthy infants born at term. The data was compared to data available in a similar previous study with mothers (Åhlund et al., 2009). Additionally, the study aimed to explore the differences in depression and anxiety levels between the two groups of fathers and any association of perceived social support at the time of the birth and hospitalisation of their infant with psychological symptoms at two to four years postpartum.

4.3 Summary of the Findings

In this study, fathers of VLBW infants reported significantly higher levels of PTSS than the term group. Seven (26.9%) of the fathers of VLBW infants in this sample scored above the clinical cut-off of 24 on the IES-R, which has been cited as an appropriate cut-off for PTSD to be a clinical concern (Asukai et al., 2002). Five of these fathers scored above 33, which has been cited as an appropriate cut-off to indicate a probable PTSD diagnosis (Creamer et al., 2003). In contrast, none of the fathers of term infants scored above 24 on the

IES-R. Fathers of VLBW infants most frequently endorsed items on the intrusion subscale and least frequently endorsed items on the hyperarousal subscale. Fathers of VLBW infants who reported higher levels of perceived social support at the time of the birth and hospitalisation of their infant, reported lower levels of PTSS. However, perceived social support was not associated with depression or anxiety levels. The findings suggest that fathers of VLBW infants do experience PTSS up to four years postpartum and that this is at a comparable level to PTSS experienced by mothers of VLBW infants up to three years postpartum (Åhlund et al., 2009).

The current study suggests there is not a difference in the levels of anxiety reported by fathers of VLBW infants and those of term infants. In this sample, one (3.8%) father of a VLBW infant had a score on the GAD-7 indicating the presence of moderate anxiety symptoms. This was not significantly different from the levels of moderate anxiety symptoms in the fathers of term infants where one (4.5%) father also reported symptoms at this level. In both groups, there were no fathers scoring at a level indicating severe anxiety. The lack of difference between the two groups in terms of anxiety levels is possibly due to the symptoms of anxiety potentially relating to being a parent of a toddler generally, which is likely to result in a number of anxieties for parents, potentially indicated by the number of fathers scoring in the mild range on the GAD-7 (nine (34.6%) of VLBW fathers and eight (36.4%) of term fathers).

There was also no significant difference in the levels of depression symptoms between the two groups. Fathers of VLBW infants did not report scores above those indicating mild depression symptoms. However three (14.3%) of the fathers of term infants scored in the moderate or moderate-severe range on the PHQ-9. Although this difference between depression symptoms in the two groups did not reach significance when the Bonferroni adjustment was applied, significance was reached when the unadjusted alpha was

applied. The slightly higher levels of the depression observed in the fathers of term infants could be as a result of potential sampling bias, it may have been that fathers of term infants who were suffering with symptoms of depression were more likely to participate in the study. Fathers were asked about depression levels currently and not specifically related to the birth of their child. No association was found between term fathers' depression levels and PTSS levels and it is possible that these increased levels are due to some other factor not measured in the current study.

4.3.1 Research question 1: Is there a difference in the levels of PTSS in fathers of VLBW infants and fathers of term infants?

There was a difference in the levels of PTSS in fathers of the two groups of infants, with fathers of VLBW infants experiencing significantly higher levels. Previous studies exploring PTSS in fathers of VLBW and premature infants have not compared them with fathers of term infants, thus the difference in the current study cannot be compared with previous research. However, studies of fathers of premature and NICU infants have shown fathers of these infants to report symptoms of PTSS (Binder et al, 2011; Lefkowitz et al., 2010; Shaw et al., 2009). To date there has been one other study which has investigated PTSS levels in fathers of VLBW infants (Elklit et al., 2007) with which the current findings can be compared. The study by Elklit et al. (2007) had six parents of two to three year olds and one parent of a three-and-a-half year old participate in their study. However, not all fathers participated in this study and the authors do not specify if these older children's fathers participated. The remaining participants in the study were parents of six-month-olds to two-year-olds, making direct comparisons between the studies problematic. They found that none of their sample of 26 fathers of VLBW infants met criteria for a PTSD diagnosis or sub-clinical PTSD (i.e. PTSS). This contrasts with the findings of the current study which

found 19.2% ($n = 5$) to score above the clinical cut-off for a probable PTSD diagnosis, with an additional 7.7% ($n = 2$) with scores indicating clinical concern. Methodological differences between the studies could explain the observed differences.

Further comparisons can be made with a study by Binder et al. (2011) who investigated fathers of premature infants. Although not all the infants in their sample had a VLBW, they did use the same measure (IES-R) as the current study, increasing the validity of direct comparisons. Measures were administered at four time points postpartum (seven days, one month, two months, and six months). Fathers meeting cut-offs for probable PTSD diagnosis were 25% at both seven days and one month postpartum, 15% at two months and 10% at six months postpartum, showing a reduction of symptoms as time increased postpartum. The results in the current study are similar to those obtained by Binder et al. (2011) at the first, second and third time point, but higher than those observed at six months postpartum. The current sample cannot give indications of development of PTSS overtime; it is possible that if the current sample's PTSS levels showed a similar trend, they would have initially been much higher than those reported by Binder et al. (2011). Other research has also shown a reduction in PTSS as time postpartum increases, for example Lefkowitz et al. (2010) found fathers reported less PTSS at a month postpartum than they did at three to five days. Alternatively, the current sample could have displayed a delayed onset of symptoms, the cross-sectional design of the current study prevents these hypotheses being explored. Evidence of a delayed onset of PTSD has been seen in other samples of fathers with infants in the NICU. In a study by Shaw et al. (2009) the percentage of participants meeting "likely diagnosis" and "at risk" criteria for PTSD at four months postpartum was significantly higher than those meeting criteria for Acute Stress Disorder at two to four weeks postpartum (33% and 67% compared with none at the first time point). There was a high attrition rate (74.1%) between the two time points and a small sample size at four months ($n = 7$), both of which

suggests potential bias in this sample and raises concerns regarding their proposal of a delayed onset of PTSS in these fathers. Attrition rates and small sample sizes seen in studies with fathers are problematic for this area of research. It is possible that those with greater severity of symptoms were more likely to participate at follow-up. However, it has also been suspected that individuals avoiding participation may be those who are most symptomatic (Shaw et al., 2009) and thus the results may be an underrepresentation of prevalence rates in their sample. This raises the possibility that the sample from the current study may also be an underrepresentation as it is possible that those who were most symptomatic may not have responded to the study invite.

The possibility of delayed onset of PTSS in fathers following the birth of their VLBW infant warrants further investigation. Research into PTSD onset following childbirth is limited (Ayuso-Mateos, 2006). There is a disparity in the findings from the current study and findings from Lefkowitz et al. (2010) who found lower rates of PTSS in fathers of NICU infants at a month postpartum than in the current study: 8% percent met criteria for a diagnosis of PTSD with a further 4% having subsyndromal PTSD. The current study found similar rates meeting criteria for a “probable” PTSD diagnosis (7.7%), but much higher rates for PTSD being a clinical concern, i.e. subsyndromal (19.2%) at two to four years postpartum. This could lead to assumptions that PTSS may develop later in fathers but as both studies are cross-sectional, neither are able to assess the development of PTSS over time. Longitudinal studies are required to examine this potential concept of delayed onset of PTSS in fathers of VLBW infants, a concept which is consistent with findings from research with parents of children admitted to paediatric intensive care where a delayed onset of PTSS has been observed (Colville & Pierce, 2012). The need to focus on physical recovery in the case of serious injury could delay the full psychological impact of a traumatic experience (Carty, O'Donnell, & Creamer, 2006). In the case of parents, they may be too preoccupied

with concerns for their child's wellbeing to take the time to seek help for themselves (Poel, Swinkels, & de Vries, 2009) or they may deny the seriousness of the NICU experience, believing it will protect them from worry and anxiety (Peebles-Kleiger, 2000).

Often there is heterogeneity of parents of premature and NICU infants used in research samples, for example, fathers in the study by Lefkowitz et al. (2010) had infants who were admitted to the NICU for a variety of reasons and Binder et al. (2011) explored premature infants as a homogenous group. Borghini et al. (2006) highlighted the need to consider all premature births as a non-homogenous group due to the differences that have been observed in different perinatal difficulties. The current study specifically looked at fathers of VLBW infants and this could explain some differences in results when comparing with other studies. Additionally differences in measures and methodologies in the studies make drawing meaningful comparisons and conclusions between studies more difficult. This has been a difficulty also noted in the literature investigating traumatic stress responses in parents of ill children (Woolf, Muscara, Anderson, & McCarthy, 2016). There is also a clear need for longitudinal data to elucidate information regarding the development of symptoms over time, as has been noted elsewhere (Treyvaud et al., 2014), to further consider the concept of delayed PTSS onset. Additionally there are difficulties with the current study in being sure that symptoms measured were in relation to the birth and NICU admission of fathers' infants when it has been two to four years postpartum; this is discussed further in section 4.5.2.1.

The levels of PTSS found in this sample (26.9%) are higher than the 11.5% found in a sample of fathers witnessing a traumatic birth (Parfitt & Ayers, 2009). Participants completed this measure between one and 24 months postpartum; the mean length of time was 10.76 months postpartum ($SD = 6.62$). There was no assessment as to whether there was any correlation with level of symptoms reported and length of time postpartum. The results from

the current study suggest greater levels of PTSS in fathers of VLBW infants two to four years postpartum than in fathers witnessing a traumatic birth up to two years postpartum.

However, in the current sample, fathers may have experienced a cumulative effect of traumatic events and thus potentially increasing their impact. The birth may have been perceived as traumatic as well as potentially multiple traumatic experiences as a result of the infant's hospitalisation in the NICU. This cumulative effect of events means fathers were potentially exposed to traumatic events for longer durations than fathers witnessing traumatic births which may not have the added trauma of infant hospitalisation. The differences observed in the results of this study compared with Parfitt and Ayers (2009) could be due to potential ongoing stress related to ongoing difficulties with the infants in the current sample. This was not measured in the current study but infants born with a VLBW have an increased risk of physical and learning and behavioural difficulties (Botting et al., 1998, 1997; Cooke, 1993). In the current sample it is not known how many of the fathers of VLBW infants experienced the birth as traumatic. For fathers of VLBW infants the traumatic experience is likely to be extended from that of fathers witnessing a traumatic birth as not only the birth but also infant hospitalisation could be viewed as traumatic as well as potential ongoing difficulties, this could account for ongoing traumatic reactions. It may be difficult to distinguish these different potential elements of the reaction and the current study does not distinguish between trauma of the birth and of the NICU hospitalisation (discussed in section 4.4.2.1).

None of the fathers of term infants in the current study reported PTSS which suggests lower rates of PTSS than found in a study by Ayers et al. (2007) who found 5% of fathers of term infants in a sample of 64 to have clinically significant symptoms of PTSD at nine weeks postpartum. These symptoms were associated with complications of delivery and the experience of negative emotions and a lack of positive emotions during the birth. In the

current study all fathers in the term group had infants who had been born via a normal vaginal delivery and the infant had not required NICU admission. These inclusion criteria were used to control for potential effects of traumatic births and so we would expect to find a non-traumatised sample. Although 70 % of the sample in the study by Ayers et al. (2007) had a normal delivery, the remainder had assisted delivery or Caesareans and thus this could explain the differences in results from the current sample of fathers of term infants. The findings of the current study are, however, consistent with others exploring PTSS in fathers of healthy term infants where symptoms consistent with a PTSD diagnosis were not found, although some subclinical levels were found (Bradley et al., 2008; Skari et al., 2002). The current study did not find any subclinical levels of PTSD in the sample of term fathers and this difference from previous studies could be due to the current study's small sample size, differences in inclusion criteria and length of time postpartum. The subclinical levels found by Bradley et al. (2008) and Skari et al. (2002) could be explained by fathers whose infants had delivery complications and in the former Special Care Baby Unit admission being included whereas they were excluded from the current study, or that measures were taken at an early time postpartum (up to six months). Differences in the studies could be explained by the current study taking measures at a much greater time postpartum. It is possible that fathers in the current sample may also have displayed subsyndromal levels of PTSS at an earlier postpartum period.

Comparing the current data with the existing research highlights difficulties in the literature with varying reports of prevalence rates of PTSS in fathers. This is likely to have been affected by the differences in measures used and at what point postpartum they have been taken. For example, Shaw et al. (2009) used the Stanford Acute Stress Reaction Questionnaire (Cardena, Koopman, Classen, Waelde, & Spiegel, 2000) and Elklit et al. (2007) used the Harvard Trauma Questionnaire-Part IV (Mollica et al., 1992). Despite

different measures used in the current study and comparison studies discussed here, they were measuring the same concepts and the current study adds to the literature which suggests that fathers, particularly those of VLBW and premature infants can exhibit PTSS. There is a paucity of research examining PTSS responses in fathers following the birth of a VLBW infant and in particular there is a dearth of research looking at potential long-term PTSS as a result of having a VLBW infant. This study is the first to explore PTSS two to four years postpartum specifically in fathers of VLBW infants.

4.3.1.1 Exploration of relationships between PTSS and infant demographic variables in fathers of VLBW infants.

Given the discussions regarding the possibility of ongoing PTSS for fathers of VLBW infants to potentially relate to ongoing difficulties with the infant, supplementary analyses were used to explore whether PTSS levels were associated with demographic variables of their infants. Although ongoing health issues were not measured, variables such as length of hospital stay and birth weight would have indicated the difficulties at birth. However these variable were not associated with PTSS levels. This is consistent with a previous study which suggested that infant illness severity does not predict levels of PTSS (Mehler et al., 2014). Similarly, illness severity and symptoms of depression in parents of NICU infants have been found to be unrelated (Mackley et al., 2010). Research in paediatric health settings has suggested that it may be parents' *perception* of the severity of the illness of their child's risk to life which would place them at greater risk for experiencing traumatic reactions rather than objective measures of illness severity (Colville & Pierce, 2012; Price, Kassam-Adams, Alderfer, Christofferson, & Kazak, 2015; Woolf et al., 2016). Uncertainty about diagnosis and management of conditions has been found to be particularly stressful for parents of children with disorders of sex development (Crissman et al., 2011; Pasterski, Mastroyannopoulou, Wright, Zucker, & Hughes, 2014), this uncertainty could also play a

role within the development of PTSS for fathers of VLBW infants. The potential impacts of being of VLBW on the trajectory of cognitive and emotional development can be uncertain. The finding that these infant demographic variables did not correlate with PTSS levels is however inconsistent with findings from Elklit et al. (2007) which suggested that the level of a child's handicap explains parents' traumatising. However, they also found that larger birth weights in premature infants are associated with greater levels of traumatising in parents, which may be as a result of these parents receiving significantly less social support than parents of smaller infants. The current study found a greater association between PTSS levels and social support than with demographic variables, discussed in section 4.2.3.

In this study, the only infant demographic variable that showed a relationship with PTSS levels in fathers of VLBW infants was the age of their infant; higher PTSS levels in fathers were associated with younger infant ages. This would therefore suggest that as the length of time postpartum increases, PTSS levels decrease. This is consistent with the findings from Binder et al. (2011). Causality cannot be inferred from this analysis though and some caution is required as this correlation was significant at the unadjusted alpha level, applied from the Bonferroni correction, and not at the adjusted alpha of .007. This therefore means there was an increased likelihood that a Type I error was made. However the significance was $p = .008$ so was very close to equalling the adjusted alpha criterion and allows for more confidence in the results obtained.

4.3.2 Research question 2: Is there a difference in the levels of anxiety and depression in fathers of VLBW infants and fathers of term infants?

The results from the current study are consistent with those found by Ghorbani et al. (2014) who found no significant difference in the levels of anxiety between parents of preterm and term infants. In the current study similar levels of moderate anxiety symptoms,

indicated by a score greater than 10 but less than 15 on the GAD-7, were found in both the VLBW and term fathers at two to four years postpartum (3.8% and 4.5% respectively). Löwe et al. (2008) consider this to be a “yellow flag” to clinically significant symptoms. Slightly increased levels of moderate to moderately-severe depression symptoms, indicated by a score greater than 10 but less than 20 of the PHQ-9, were found in the term fathers compared to the VLBW fathers (13.6% and 0% respectively). However, this difference was not significant when the Bonferroni correction was applied. The mean scores for both fathers of VLBW infants and fathers of term infants on both the anxiety and depression measures fell within the normal range (see Table 10, page 80) and thus did not suggest elevated levels of symptomatology compared to what would be expected in the normal population.

The level of potentially clinically significant symptoms in the current sample is lower than that found by Bradley et al. (2008) who found 6.6% of their sample of 199 fathers, who had witnessed the birth of their child, reported clinically significant symptoms of anxiety at six weeks. These fathers had healthy infants and the elevated levels of anxiety could be as a result of the measures being taken relatively shortly after their child was born and the likely increased anxiety that would be present for new fathers. This is supported by the finding that 11% of 122 fathers of healthy babies reported clinically significant anxiety scores (≥ 40 on the State Anxiety Inventory; Spielberger, Gorsuch & Lushene, 1970) during the first days after birth (Skari et al., 2002), however they also found this percentage to remain at a similar level up to six months postpartum (10%). Attrition rates meant 81 of the 122 fathers completed measures at six months. Skari et al. (2002) note the levels of anxiety observed in their sample are similar to those expected in the general population and this would indicate the levels found in the current sample are also no greater than would be expected in the general population. This contrasts with a study by Feeley et al. (2007) who found mothers

and fathers of VLBW infants had mean state anxiety scores greater than gender- and age-specific norms at nine months postpartum.

In contrast to the current study, Treyvaud et al. (2014) found levels of moderate-severe anxiety were more likely to be reported by primary caregivers of premature infants than term infants, when their child was seven. They also found depression scores to be higher in the premature group whereas the current study found no difference between the two groups when using the adjusted alpha. The difference was however approaching significance but in the opposite direction to the study by Treyvaud et al. (2014), fathers of term infants were showing a trend towards slightly higher reported depression scores than fathers of VLBW infants. These differences may be explained by the sample of Treyvaud et al. (2014) mostly consisting of women, versus the current sample of men and therefore may suggest gender differences between the two groups. Mehler et al. (2014) found postnatal depression increased for fathers of term infants from term to three months postpartum, in contrast to fathers of preterm infants whose depression levels decreased in the same time period. Consistent with this finding is the slightly raised reporting of depression in the term group in the current study, 13.6% scoring in the moderate and moderate-severe range on the PHQ-9 versus 0% scoring in these ranges for the VBLW group. In contrast, elevated levels of depressive symptomatology were found in fathers of premature infants in a medical NICU in a study by Mackley et al. (2010), indicated by scores of 16 or more on the CES-D which suggests mild to severe depression symptomatology. There was no comparison control group in this study though and other studies have also found fathers' levels of depression are higher in those who have preterm infants than term infants at 10 to 20 days postpartum (Candelori et al., 2015) and four to six weeks postpartum (Helle et al., 2015). Other research suggests that differences between depression and anxiety symptoms in parents of NICU infants and term infants is no longer significant at nine months postpartum, with NICU parents initially having

greater severity of symptoms (Carter, Mulder, Frampton, & Darlow, 2007). A lack of measure of other current life events means it is not possible to assess if depression symptoms in this sample could be attributed to some other life event. It is possible that fathers in the term group were more likely to respond if they had higher mental health symptoms and thus the finding could be as a result of sampling bias.

4.3.3 Research question 3: In fathers of VLBW infants, is there a relationship between levels of perceived social support at the time of the birth and hospitalisation of their infant and levels of PTSS, anxiety and depression two to four years postpartum?

According to theoretical models of PTSD, social support impacts on an individual's ability to cope by influencing appraisal mechanisms, which can either be helpful or induce further distress (Joseph et al., 1997). Social support has been shown to help people in crisis situations (Park, Cohen, & Murch, 1996). Previous research has found that lack of social support did not directly predict the development of PTSD in parents of VLBW infants as assessed by a regression analysis, but it was a factor which parents found positive and meaningful, with no gender differences reported (Elklit et al., 2007). This is in contrast to the current study which found lower PTSS levels to be associated with higher perceived social support, although the study was not able to assess predictive power of this variable due to the small sample size. These findings can be compared with findings that stress-related growth is enhanced by the utilisation of social support (Park et al., 1996). Parents in the study by Elklit et al. (2007) reported high levels of perceived social support immediately after the birth which can be compared with the high levels found in the current study, although the current study assessed in terms of retrospective memories of perceived social support at the time of

the birth and hospitalisation of their infant. High levels of perceived social support have also been found in parents of preterm infants up to three months postpartum (Mehler et al., 2014).

The results from Elklit et al. (2007) need to be interpreted with caution as the measure of social support used (the Crisis Support Scale; Joseph, Williams & Yule, 1992) was found to have unsatisfactory reliability and discriminatory power. In contrast, the measure of perceived social support in the current study, the ESSI, was found to have good reliability. Although the measure of perceived social support used in this study, the ESSI, was developed for use in hospital settings, it does not include questions that specifically pertain to the support received from hospital staff; questions refer to all types of support made available to the respondent. This makes it unclear as to where fathers perceived their support to be coming from and thus it is not possible to draw conclusions as to the type of support they perceived to be most available (i.e. from hospital staff, family, partners etc.). Research has suggested that hospital staff have an important role in providing support to fathers whilst their infant is in the NICU (Deeney et al., 2009; Garten et al., 2011). It is unclear whether the support in these studies is as a result of the crisis situation parents find themselves in with infants of VLBW or whether they reflect the social networks available prior to the birth of their child.

The results of the current study are inconsistent with findings of other studies which have shown a positive association between levels of social support and anxiety in parents of VLBW infants at two weeks post-discharge (Zelkowitz et al., 2007). In a systematic review of mothers of preterm and VLBW infants, lack of social support has been shown to predict postpartum depression (Vigod, Villegas, Dennis, & Ross, 2010). Differences between these studies and the current findings could be due to differences in times when measures were taken. The studies mentioned above assessed anxiety and depression symptoms and perceived social support at the same time. The current study measured retrospective recall of

social support and current anxiety and depression symptoms. It may be that the retrospective nature of the social support measure could have resulted in differences in recalls of this social support compared to the time of the birth, introducing bias. Additionally, it may be that no relationship was found with anxiety or depression because the measure of social support was in relation to what fathers' perceived at the time of the birth and hospitalisation of the child of their infant, no measure of current perceived social support was taken. This may suggest that the beneficial effects of social support on anxiety and depression observed in other studies (Vigod et al., 2010; Zelkowitz et al., 2007) at the time of the birth may not have long-lasting benefits on these symptoms.

4.3.4 Research question 4: How do levels of PTSS in fathers of VLBW infants compare to PTSS in mothers of VLBW infants?

Although the study by Åhlund et al. (2009) and the current study investigated two different cohorts of parents the methodology used in both studies was very similar. The finding of comparative analyses that PTSS can be as significant a difficulty in fathers as in mothers are inconsistent with the finding that women develop PTSD symptoms to a higher degree than men following various traumas (Kessler et al., 1995) and that they are twice as likely to suffer from PTSD than men (Mathers et al., 2004). Research has suggested men may be less likely than women to express or share their feelings with others (Tamres, Janicki, & Helgeson, 2002). However, the current study suggests that, in a self-report study, men were just as likely as women to express their feelings and perhaps this indicates how men are asked to express their feelings may affect whether they do so or not. These results could reflect that in the NICU both parents are equally helpless and unable to care for their baby in the way parents of babies not requiring NICU admission are able to parent their infants. This

may therefore mean that both parents are equally vulnerable to developing PTSS following this life event.

The findings of the current study are inconsistent with findings of other studies where mothers and fathers have been compared in the same cohort of parents and mothers have been found to report greater PTSS than fathers (Elklit et al., 2007; Iles, Slade, & Spiby, 2011; Lefkowitz et al., 2010). However, Ghorbani et al. (2014) found that fathers' chance of having PTSD was almost 3.5 times higher than in mothers. Similarly, Shaw et al. (2009) found a higher prevalence rate in fathers than mothers at four months postpartum. Differences between the above samples and the current sample could result from differences in sample sizes. In previous research the sample size of fathers has been considerably smaller than that of the mothers. In the current study, for VLBW parents, the sample size of mothers and fathers were similar and for term parents, the sample size of mothers was smaller than that of fathers. The differences could also be explained by the use of different cohorts of parents in the current study which could have introduced bias to the sample. The findings of the current study are however consistent with the overall pattern of findings across a number of studies in paediatric research that show psychological responses of mothers and fathers of chronically ill children are more similar than they are different (Phares et al., 2005). For example, PTSD symptoms in mothers and fathers are comparable in the field of childhood oncology (Kazak et al., 1998, 2004).

4.3.4.1 Comparing PTSS levels in parents of VLBW infants and parents of term infants two to four years postpartum.

Supplementary analyses revealed that parents of VLBW infants reported significantly higher levels of PTSS two to four years postpartum than parents of term infants, a significant difference maintained for all subscales on the IES-R. This finding is consistent with previous research both into parents of VLBW infants and parents of premature infants, which has

found parents of these infants to report higher levels of PTSS than those of term infants (Elklit et al., 2007; Ghorbani et al., 2014; Iles et al., 2011; Lefkowitz et al., 2010; Shaw et al., 2009). Due to the increased length of time postpartum at which measures were taken in the current study, this suggests that these differences between parents of VLBW and term infants are maintained long after the birth. This has implications for the effect on infant attachment and development, further discussed in section 4.3.4. It also further highlights the potential psychological impact for parents of these infants.

4.4 Clinical Implications

The clinical implications of postnatal PTSS in fathers of VLBW infants and their families have been discussed in section 1.6. This section will discuss the clinical implications of the findings of the current study. Areas highlighted include service development with particular reference to routine screening for PTSS, diagnostic categorisation, the expectation that fathers attend the birth of their child, the potential need for encouraging men's help-seeking behaviour and the potential clinical impact on infant development.

4.4.1 Service development.

The current study contributes to the existing limited literature into postnatal PTSS in fathers by showing that fathers of VLBW infants can experience postpartum PTSS up to four years after the birth of their infant. It would be prudent for the evidence from the research thus far to be used to begin to consider relevant appropriate guidelines for services to screen for and support fathers with experiences of PTSS postnatally, as the literature suggests fathers can and do suffer from this phenomenon. Currently there is no NICE guidance which looks specifically at postnatal care for fathers, whether they be fathers of term or premature babies. The current study and others suggest this is an area that services need to consider. For example, Hinton et al. (2014) suggest that there is a need for developing guidance to support

partners during and after complicated childbirth. Currently the only NICE guidance in postnatal care that refers to the partner of the mother is the Quality Standard for Postnatal Care (NICE, 2013) which states that parents with infant attachment problems should receive services designed to improve the relationship with their baby. This is in comparison with specific guidance that is provided for postnatal mental health problems in women (NICE, 2014). NICE are currently developing a quality standard for preterm labour and birth (expected to be published in October 2016) which references partners' and families' roles in supporting the mother but not the support they may need themselves. The results of this study and previous research suggest service guidelines and quality standards need to move away from only considering fathers in a supportive role to the mothers and towards considering their individual needs and the support they may require themselves.

Further, there is evidence that fathers would welcome such support and the development of organisations such as Dads Matter UK is testament to this. During the process of conducting this research the need for support for fathers of VLBW infants was highlighted in particular. During the development stage of this project a parent-baby group for parents of VLBW infants was attended by the researcher (see section 2.5), which highlighted that fathers often felt left out of service provision due to appointment times often being in working hours. Caution should be taken here though as this was gleaned from second-hand reports from the mothers attending the group. The experience of recruiting through clinics for this study suggested fathers are particularly involved with the care of VLBW infants, with many attending clinic appointments. This is supported by research from a national maternity survey suggesting two thirds of fathers attend antenatal appointments (Redshaw & Henderson, 2013). It would be important to involve fathers in the development of services to support them and this study suggests fathers are willing to engage in research that would help this development. This would need to be conducted within the context of the

concerns raised in the Introduction, section 1.7, regarding the challenges of including fathers in research.

4.4.1.1 Routine screening of PTSS.

With findings from this study indicating that 26.9% of fathers were experiencing some level of PTSS two to four years postpartum, it would suggest routinely screening fathers for symptoms could be beneficial, to ensure appropriate intervention could be offered as necessary. Services could capitalise on the involvement of fathers of VLBW infants at clinic appointments by using this as an opportunity to assess mental health states of fathers as well as checking infant development. Although not as effective at identifying diagnosis as a diagnostic clinical interview, self-report measures have important clinical utility in screening for potential distress (Lefkowitz et al., 2010). There are three issues with screening, consideration of: (a) the most appropriate screening measures for fathers, (b) when these measures should be used, and (c) whether fathers are involved in services enough to enable these measures to be used efficiently. Routine screening outside the research context is rare (Colville & Pierce, 2012), which is problematic given the guidelines that at risk populations for PTSD are monitored prior to providing evidence-based interventions to those with significant or persistent symptoms (NICE, 2005). There is recent evidence that a ‘screen and treat’ approach is valuable for at risk groups for PTSD (Brewin et al., 2008), although Shaw et al. (2013) have argued for universal screening of parents rather than profiling those at potential high risk because of their infant’s medical severity. It is acknowledged though that routine screening of both parents would place additional strain on services already under-resourced (Spencer, 2014).

The results of the current study suggest that the IES-R may be an appropriate measure to use within services for routine clinical screening of fathers of VLBW infants. It is freely available to services and has been well validated. The current study suggests that the

measure may be reliable for use in this population. However, there were some limitations to the use of this measure within the current study which are discussed in section 4.4.2.1. Vesel and Nickasch (2015) suggest the need for systematic reviews to determine the best screening tool to assess postnatal PTSD. The diagnostic changes introduced by DSM-5 (APA, 2013) do have implications for screening (Ayers, 2013) which research needs to consider as well to ensure appropriate methods are being used clinically. In terms of considering when measures should be taken, Hollins Martin (2012) recommends routinely enquiring about the psychological state of the father in the days and weeks following the birth. Czarnocka and Slade (2000) recommend screening at six weeks postpartum. The findings of the current study indicate that a posttraumatic reaction can be experienced a number of years after the birth, unfortunately they do not provide information as to the likely onset time of these symptoms. However, it does suggest that it may be appropriate to consider screening at much later times postpartum to assess prevalence of symptoms, this may pose difficulties in terms of fathers being involved with appointments regarding their infant as they are not routinely included in paediatric interventions (Seiffge-Krenke, 2002) and thus may rely on men seeking help; the encouragement of which is discussed in section 4.3.3. Finally, when considering how to include fathers in screening methods, perhaps future research could investigate how fathers would like to be included with this. For example, a focus could be on the practicalities of screening fathers. The low response rates in the current study would suggest that postal screening measures would not be appropriate. Further, although many fathers did attend clinic appointments, not all did and it may not be possible to rely on fathers attending such appointments to offer screening. Perhaps the use of online surveys emailed to fathers could be an avenue for exploration. Importantly fathers need to be included in the development of services to use screening methods more routinely.

4.4.1.2 Interventions for postnatal PTSS in fathers of VLBW infants.

To the researcher's knowledge there are limited specific interventions for postnatal PTSS in mothers or fathers and the results of this study point to a need to consider the intervention needs for parents dealing with these symptoms. There are a number of opportunities for clinicians to check the mental health status of parents as VLBW infants are followed-up closely for the first two years of their life. The current research suggests that PTSS could be present in fathers at two to four years postpartum. Mental health difficulties should be given consideration at a number of time-points when the family might be seen by hospital staff. More thorough screening may enable fathers to be identified at a point where appropriate intervention can be given.

A six-session treatment intervention developed to reduce PTSS, depression and anxiety in parents of premature infants, which included psychoeducation, cognitive restructuring, progressive muscle relaxation, and trauma narrative development, resulted in a greater reduction in trauma and depression symptoms in a group of mothers compared to controls not receiving the intervention (Shaw et al., 2013). However, it cannot be assumed that successful interventions for mothers could be effectively applied to fathers. For example, a parental intervention aimed at reducing stress levels of parents of VLBW infants whilst their infant was hospitalised in a NICU were effective in reducing stress-role alteration in mothers, but not fathers (Matricardi, Agostino, Fedeli, & Montiroso, 2013).

It may be that specific interventions are not required but the opportunity for fathers to talk about their experiences could be; there is a suggestion that fathers feel that it is not appropriate for them to consider their own feelings (Hinton et al., 2014). Talking could help to normalise the reactions and may aid with processing of traumatic memories and to make sense of their experiences. Developing this narrative around the events may help support the relationship with their child too (McFadyen, 1994). This may link to the need noted by

Yehuda (2002) to legitimise events as valid explanations of symptoms. Feedback obtained from participants during the current study suggested that the questionnaires had prompted them to think about their thoughts and feelings regarding the birth and hospitalisation of their child for the first time, indicating this was not something they had previously been asked about.

There is some evidence to suggest that parents of children who have been admitted to intensive care who have higher baseline levels of stress benefit from a two month follow-up appointment after their child has been discharged. These parents showed significantly lower levels of PTSS and depression at five months post-discharge than those parents not offered the follow-up appointment (Colville, Cream, & Kerry, 2010). Postnatal debriefing has been associated with reductions in PTSD in women (Gamble et al., 2005; Meades, Pond, Ayers, & Warren, 2011). It has been recognised that research has indicated the management of PTSS in postnatal populations may require different management strategies from the management of PTSS following other traumatic events. There is evidence that psychological debriefing may be ineffective and potentially increase the risk for PTSD (Rose, Bisson, Churchill, & Wessely, 2002) and it is recommended that this is not routinely practiced by NICE (2005). However, the NICE (2014) guidance for Antenatal and Postnatal Mental Health recommends advice and support should be offered to those women who have had a traumatic birth and wish to talk about their experience, with it being recommended that the effect on the partner also be taken into account. The recommendation is for a postnatal discussion which is in contrast to critical incident debriefing referred to in the NICE (2005) guidelines for the management of PTSD. This postnatal discussion is now implemented clinically in services for parents, however Spencer (2014) notes that there is not always provision for fathers and there are discrepancies in the availability of the service for mothers.

Research into Pediatric Medical Traumatic Stress (PMTS) could assist with the development of appropriate interventions for fathers following the birth of their child. The Integrative Trajectory Model of PMTS (Price et al., 2015) provides a conceptual framework for understanding children and families' psychological reactions across different types of paediatric illness and injury. The model consists of three phases; Peri-Trauma, Acute Medical Care and Ongoing Care or Discharge from Care with differing levels of intervention required in each phase. The final phase highlights the potential for traumatic responses to continue for months or years beyond the active medical treatment phase and thus would be of most relevance to the fathers within the current study sample. Price et al. (2015) highlight the need to monitor changes in PMTS over time with repeated screening. Where PTSS is found it may be appropriate to offer trauma-focused psychological intervention as recommended by NICE (2005).

4.4.2 Fathers' attendance at the birth of their child.

It has been suggested that fathers are given more agency in the choice about whether or not they attend the birth of their child rather than their attendance being an "expectation" (Hollins Martin, 2012). The results from this study suggest this does need to be given consideration. Perhaps there is a role in providing parents with the information from the literature in order that they can make an informed decision about whether the father will attend. However, in terms of the current study it is not possible to distinguish if the elevated PTSS levels reported by fathers of VLBW infants are related to witnessing the birth of their child or the hospitalisation in the NICU, further discussion of which is given in section 4.5.2.1. It has been suggested that there are links between the development of postnatal depression in fathers and whether or not they attended the birth (Spencer, 2014) and in premature births the lack of preparation of parents increases the risk of postnatal mental

health difficulties (Whittingham et al., 2014). Premature births are also more likely to involve complications of delivery and Caesarean sections, in the current sample 66.7% of the VLBW infants were born via Caesarean section, these complications are likely to increase the perception of the experience as being traumatic. For example, partners of women having emergency Caesareans reported more PTSD symptoms (Zerach & Magal, 2016).

4.4.3 Encouraging men's help-seeking behaviour.

This research indicates that in the current sample a significant proportion of fathers of VLBW infants were experiencing symptoms at two to four years postpartum. However, this study did not assess as to whether they were currently seeking any help for difficulties they were experiencing. Men are often reluctant to seek help for difficulties and this can lead to poorer health outcomes (White, 2001). Further, Hinton et al. (2014) found fathers experiencing mental health problems following childbirth do not necessarily seek help. Therefore a clinical implication from the current study would indicate that if these levels of PTSS are being experienced by fathers, services need to ensure that they are facilitated to seek and receive help for such difficulties. The results indicate that these fathers may not have sought help if elevated PTSS levels are being reported up to four years postpartum. This may also involve an increase in awareness that fathers can suffer from postnatal mental health difficulties as well as mothers to reduce some of the potential barriers to men seeking help for postnatal PTSS. Some research has suggested it is difficult for fathers to find support and get acknowledgment of their distress from professionals with others finding it difficult to talk with family and friends, leaving them feeling isolated when dealing with their trauma (Hinton et al., 2014). Sullivan, Camic, and Brown (2015) have noted that services may need to consider other forums in which to offer support for men seeking help, such as the internet. The key time for health-care professionals to be working with men is during

their partner's pregnancy (Spencer, 2014), this could aid in greater education about the potential mental health problems for fathers and thus may facilitate them in coming forward for help and support when it is needed.

4.4.4 Considerations for infant impact.

Research has indicated the potential effects of postnatal mental health problems in fathers on their infant's development and, as has been noted, VLBW infants have increased risks of their development being adversely affected as a result of their birthweight (see Introduction, section 1.2.2). The findings in the current study regarding the potential for fathers of VLBW infants to experience PTSS suggest interventions may need to be put in place to prevent adverse effects on infant development. Undiagnosed, unrecognised, and untreated PTSD symptoms in parents during their child's infancy can interfere with attachment and emotional bonding (Clotey & Dillard, 2013). Early paternal contact with the NICU infant is important in enhancing early attachment (Mackley et al., 2010) and poor relationships during the 1001 critical days period (first two years of life) predict higher levels of physical and emotional health issues in infants (APPG for Conception to Age 2: The First 1001 Days, 2015). Encouragement of the paternal role and development of the father-infant relationship whilst their infant is hospitalised is therefore important (Hynan, 2005). Some research has suggested prenatal mental health problems were associated with parent-infant interactions to a greater extent than postnatal mental health difficulties (Parfitt, Pike, & Ayers, 2013) and thus this may be an area for further investigation.

4.5 Methodological Critique: Strengths and Limitations of the Study

The following section provides a methodological critique of the current study with a discussion of its strengths and limitations with respect to the design, sample and measures

used. Consideration is given to how the limitations could potentially be addressed in future research.

4.5.1 Strengths of the study.

A considerable strength of this study was that fathers were invited to participate directly and were not invited via mothers, in line with recommendations from Costigan and Cox (2001), and this therefore may have increased participation rates. It can be a challenge to recruit fathers into research but important and meaningful findings emerge when they are included (Phares et al., 2005). Ideally mother and father investigations would occur in parallel as recommended by Phares (1996a), however this was not done in this study for a variety of reasons, chiefly resources and time did not permit this investigation. Mothers of VLBW infants have been investigated before, sometimes with fathers as well (e.g., Elklit et al., 2007), but father sample sizes have been very small and thus a novel aspect of this piece of research was recruiting fathers only. The research questions in the current study pertained more to prevalence rates as opposed to relationships between mother and father symptoms and thus it was not critical to have data from both parents of an infant. As data for mothers had been collected relatively recently in a similar study (Åhlund et al., 2009) and using similar methodology these were deemed to be a viable sample for comparison with the fathers' data. There are some evident limitations of this with mothers and fathers for comparison being from different cohorts of parents and thus they may have had different experiences so caution is required in the interpretation of these results.

Given the difficulties that have been cited previously with involving fathers in paediatric research (Costigan & Cox, 2001), significant attempts were made by the researcher to increase father participation. In addition to inviting fathers directly to the study, as mentioned above, the cross-sectional design meant that burden on participants was minimised

as measures were only required to be completed at one time point and thus likely to result in fathers feeling able to participate without the time burden that can be associated with some studies. Additionally, the anonymous nature of self-report measures may also have increased participants likelihood of responding in an honest manner (Clark-Carter, 2008). The lack of relationship developed with the researcher may also reduce pressures of demand characteristics to respond in a certain way. By offering an anonymous response this may have enabled a more accurate insight into the symptoms present in the participants.

This study has also contributed to the research literature regarding fathers' postpartum mental health. PTSS in fathers of VLBW infants has had only limited attention in the literature, but particularly studies have not looked at longer-term impacts which this study sought to do. The longer-term design has resulted in this study contributing to a significant gap in the current literature in the field and thus represents a strength of the study. Although the effect size and power for this study were problematic (see section 4.4.2.3) the effect size and power were very good when considering the supplementary analysis where results from mother and fathers of VLBW infants and term infants were combined to assess differences between VLBW parents and term parents. The effect size of this analysis was 0.71 with a power of 0.89.

This study used standardised measures to assess PTSS, depression and anxiety, the use of which was a further strength of this study. Additionally, all the measures in the current study were found to have high internal consistency (between Cronbach's $\alpha = .81$ and $\alpha = .96$). There was also not a large amount of missing data in this study (see section 3.2.1.2 for full details). There were no missing data for the ESSI and only one point missing in both the GAD-7 and PHQ-9 across both groups. The IES-R did have a larger amount of missing data, discussed in section 4.4.2.4. By using measures of anxiety and depression as well as PTSS, the current study attempted to address a limitation noted in the mothers' study (Åhlund et al.,

2009) that anxiety and depression symptoms were not formally assessed. A further strength was that participants were asked about pre-birth mental health difficulties, which has been shown to be a risk factor for developing PTSD following exposure to trauma (Brewin et al., 2000).

Although the ESSI, used to assess perceived social support at the time of the birth, is a measure developed for the use with patients recovering from myocardial infarction (Mitchell et al., 2003) and has not been validated for use in the current population, the internal consistency for the ESSI in the current study was high with Cronbach's $\alpha = .88$. This is comparable with that found when used in patients with myocardial infarction (Cronbach's $\alpha = 0.88$; Vaglio et al., 2004). The internal consistency in the current study was improved when item 7 was removed (Cronbach's $\alpha = .90$) which could be due to this item not being measured on a Likert scale in the way all other items in the scale were. The excellent levels of internal consistency suggests that the ESSI may be a reliable measure to use within postnatal research. The measure was selected over other measures of social support because it assesses perceived as opposed to received support. Additionally the measure was developed for use in hospitals and thus also assesses the perceived support from hospital staff as well as friends and family members. This may be particularly important for fathers of VLBW infants who will spend a considerable amount of time in hospital and the support of staff there has been shown to be an important factor for fathers in the NICU (Garten et al., 2013). Finally, the ESSI is a short measure, with only seven items, and thus reduced the burden of completing the measure.

An additional strength of the study was the attempt to match participants in the VLBW and term group according to the date of birth the infant was born on. This was done to gain some control over the average length of time postpartum in each group. This matching process aimed to reduce extraneous variability in the samples. Matching occurred

at the selection point of potential participants to whom invite letters were to be sent.

Although complete matching between the participants in the final sample was not achieved there were no significant differences between the length of time postpartum across the two groups and additionally infant gender distribution was similar across the groups (see section 3.3.2). Thus, potential effects of these variables were successfully minimised and the study design enabled a reduction in variance which may have resulted from an unmatched sample.

4.5.2 Limitations of the study.

There were several identified limitations to the current study. These are specifically focused on the measures, sample size and characteristics, and missing data. Each of these will be explored in the following section.

4.5.2.1 The use of the IES-R.

Feedback from some participants in the term group suggested the wording of the IES-R instructions may have been ambiguous resulting in some confusion as to what was being requested of participants. The IES-R was chosen as the measure of PTSS since researchers are able to specify the event they require respondents to consider when completing the questionnaire. The wording used in the current study was similar to that used in the study of mothers (Åhlund et al., 2009). For fathers of term infants the wording was:

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to the birth of your child in [MONTH, YEAR] and having your child cared for at the Norfolk and Norwich University Hospital immediately after the birth. How much were you distressed or bothered by these difficulties in the past seven days?

For fathers of VLBW infants the wording was the same but referred specifically to their child being cared for in the NICU. Some questionnaires were returned by fathers of term infants with comments by these instructions indicating that it had not been clear what was being asked, for example some participants indicated their responses referred to how they had felt immediately after the birth of their child. This does introduce some potential bias to the responses. It was interesting that this confusion only appeared to occur for the term group, which may indicate that these fathers were not traumatised but had found the birth difficult at the time, a perfectly normal response. Alternatively it may also be that for the VLBW group the whole experience is difficult, but for parents of term infants there is no reason why the hospital stay is.

Another difficulty with the IES-R used in this study is that it is not clear if in the VLBW group fathers' responses pertain to traumatic experiences of the birth of their infant or if they pertain to traumatic experiences of having their child cared for in the NICU. Fathers were asked to think about both events when answering the IES-R, in the same way mothers had been asked to consider both events in the study by Åhlund et al. (2009). Evidence would suggest that a cumulative effect of both events caused there to be elevated levels of PTSS in this group of fathers. Additionally due to the length of time postpartum it may be that fathers have had subsequent children since the child questions were being asked about. Experiences of the birth and/or hospitalisation of these subsequent children may have introduced bias into the results, particularly, if a father of a term infant has subsequently had an infant admitted to the NICU. However, these are all inherent difficulties with self-report measures as there is no opportunity for the researcher to ask any clarifying questions. A difficulty with self-report measures is that they have been shown to potentially inflate prevalence rates of postnatal PTSD (Parfitt & Ayers, 2009). Therefore the results of this study are comparable with previous ones based on use of the IES-R or other self-report measures.

There is some evidence to suggest that the use of the IES-R may not be the most appropriate for studies investigating postnatal mental health difficulties and that the original IES may be a psychometrically stronger measure of postpartum PTSS. This is due to the exclusion of hyperarousal from the IES, which is commonly present in new parents (Olde et al., 2006), and that the IES has been found to be reliable in measuring postpartum PTSS in men and women (Iles et al., 2011). However the study by Olde et al. (2006) was conducted in Dutch women and thus findings may not be generalisable to British males. Further, Johnson (2002) noted that the intrusion scale on the IES is not able to differentiate between negatively or positively experienced intrusions (of which the same criticism can be applied to the IES-R) and note that further research is needed in this area. Particularly in reference to the current study, intrusions about the birth may be associated with positive intrusions. For example, in this study fathers of VLBW infants frequently endorsed the item “any reminders brought back feeling about it”; the questionnaire does not make distinction about what the feelings were. As the questionnaire is a screen for PTSD it is assumed these will be negative, but within the context of the current study this assumption may not be valid.

Although the IES and IES-R have been consistently used in postnatal research, McKenzie-McHarg et al. (2015) suggest that future research should consider development of more appropriate screening measures. A difficulty with PTSD measures for this population is that they capture changes in somatic items, hobbies and socialising, all of which may change following the birth of a child. McKenzie-McHarg et al. (2015) additionally note that measures are based on DSM-IV (APA, 1994) diagnostic criteria and research is needed with respect to the new criteria of DSM-V (APA, 2013) to determine any implications these may have on prevalence rates of postnatal PTSD. In the development of appropriate screening measures it will be important to consider the differences between mother and father responses and whether the same measure is appropriate for use with both or if different measures would

be more appropriate. Consideration could also be given to screening tools recommended for parents in the paediatric literature, for example, the Screening Tool for Early Predictors of PTSD (Winston, Kassam-Adams, Garcia-Espana, Ittenbach, & Cnaan, 2003).

4.5.2.2 Measurement of pre-birth mental health difficulties and prior trauma experiences.

In the demographic questionnaire one question asked fathers to indicate if they had experienced mental health difficulties prior to the birth of their child; difficulties included depression and anxiety, with a space to write other disorders. A limitation was that PTSD was not specified as one of the options. No participants who responded to “Other” in this question specified PTSD, suggesting that these symptoms were not present in the sample prior to the birth of their children. However, there was no measure of trauma events either prior to or after the birth of the child which may have affected PTSS in participants. This measure was not included due to concerns about the length of the questionnaire affecting participation rates, but future research may want to consider taking a measure of stressful/traumatic life events as it has been found that previous exposure to trauma can predict the development of postpartum PTSD in women (Lev-Wiesel, Chen, Daphna-Tekoah, & Hod, 2009; Sumner, Wong, Schetter, Myers, & Rodriguez, 2012).

4.5.2.3 Sample size and characteristics.

The sample size for the current study was small, resulting in the study being statistically underpowered. Every effort was made to increase the participant numbers in the current study (see Appendix A). A priori power calculations (see section 2.3) indicated a necessary sample size of between 27 and 33 in each group. The lower bound of this number was nearly achieved for the VLBW group with 26 participants, but was not achieved for the term group with 22 participants. The small sample size was due to the poor response rates which this study obtained. Response rates were 26/172 (15.1%) for the VLBW group and

22/166 (13.3%) for the term group. The response rate was considerably lower than that achieved in the mothers' study of 34% for VLBW mothers, but similar to the 13% for term mothers (Åhlund et al., 2009). This low response rate may have introduced bias into the sample and affected the power of the study to detect effects. Effect sizes for the secondary research questions were small, resulting in very low power. For example, the effect sizes for research question three which explored the associations between scores on the ESSI and scores on the IES-R, GAD-7 and PHQ-9 ranged from 0.08 to 0.31. It is important to note that this study was pilot in nature, due to the lack of previous research in this area before. The findings would suggest that this is an area that would warrant further investigation.

The low response rates also further highlight the challenges of including fathers in this type of research. Response rates can be improved by intensive follow-up strategies and shorter questionnaires (Nakash, Hutton, Jørstad-Stein, Gates, & Lamb, 2006). Attempts were made to improve response rates in the current study with the use of two follow-up reminder letters and the measures were kept as short as possible whilst still enabling the relevant data to be collected. Unfortunately follow-up could only be provided for those who responded to the initial invite and consented to the chief investigator contacting them (see section 2.5 for procedure details). Response rates were slightly better to the initial invite letter; 32/172 (18.6%) in the VLBW group and 26/167 (15.6%) in the term group. The procedure used, however, meant that follow-up could not be provided to 81.4% of the VLBW group and 84.4% of the term group. Future research should consider ways to follow-up the full sample size to increase participation rates. Reminder letters proved successful within this study with a total of 37.8% of participants who were sent one or two reminder letters returning their participant packs. This would indicate future research should aim to make more use of follow-up procedures. Of those initially responding to the invite letter 26/32 (81.3%) of the VLBW group and 23/26 (88.5%) of the term group returned their participant pack. This

would indicate that future research may want to consider sending out participant packs as part of the initial contact. It was not possible to obtain demographic data for fathers who did not respond to the questionnaire and thus not possible to determine whether or not there were differences in responders and non-responders in terms of demographic characteristics. Additionally, ethical approval for the current study did not include the researcher obtaining demographic data for the infants of non-responders and thus again it was not possible to see if responders and non-responders differed on these variables too. Full details of the recruitment efforts in this study are described in section 2.5. Research has suggested that telephone interviewing has been found to be effective for fathers in health research (Kirsch & Brandt, 2002) and thus could be a consideration for future research in the field to increase response rates. However, this does have the disadvantage of being more resource and labour intensive for the researchers.

The sample of the current study was homogeneous, affecting the generalisability of findings. The majority of participants were white British (89.6%). All the fathers in both groups were in employment at the time of the birth. There are some key variables which have been shown to affect the development of postpartum PTSD in women which were not measured in this study, such as socioeconomic status and genetic factors (see Vesel & Nickasch, 2015). Prior trauma has been found to be the most important predictor of maternal postpartum PTSD (O'Donovan et al., 2014), which is consistent with risks noted in the wider PTSD literature (Cahill & Pontoski, 2005). Future studies could look at these variables in more detail to determine any potential predictors of the development of PTSS in fathers of VLBW infants.

There was only one response received from a father who did not live with his infant all the time. The methodology used in the current study meant that it was unlikely that fathers in separated families would have responded to the questionnaires. Attempts to

mitigate this bias were made by addressing invite letters to the father of the child. However, we only had approval to send letters to the infant's current address as this was reasonable to be accessed by hospital staff, they could not access current addresses of fathers which may have been different if they were no longer living with their infant. Therefore we relied on mothers to pass the letter to fathers which may have depended on the amicability of any split. This is problematic as a critique of literature investigating fathers is that research is usually conducted within intact, middle-class, Caucasian families (Coley, 2001; Zimmerman, Salem, & Notaro, 2000). A large percentage of children not living with their fathers continue to have at least some contact with them (Hofferth, Stueve, Pleck, Bianchi, & Sayer, 2002), which therefore means the father is still likely to have an influence on child development and attachment. Research suggests that even when fathers do not have extensive contact with their children they can still influence children's functioning (Greene & Moore, 2000). Thus it is important that these fathers are also included in research exploring the psychological impact on them.

4.5.2.4 Missing data.

As discussed in section 4.4.1, missing data was not a huge problem for this study. In terms of full questionnaires missing, one participant in the VLBW group did not complete the PHQ-9. One participant in the term group did not return their demographic questionnaire and efforts were taken to gain this missing questionnaire (it was unfortunately excluded from the original pack due to a clerical error) from this participant with a further questionnaire and letter being sent in the hope it would be returned to complete the full data set. There were a considerable number of missing data points on the IES-R, with four VLBW participants having up to 30% of items missing and in the term group two participants missing up to 10% of the data. It was suspected that some of the missing data points may have been as a result of questionnaires being printed double-sided, with the last items being the ones most

commonly missed. This was rectified immediately this pattern was noted with questionnaires being printed single-sided for the remainder of the recruitment period. Mean replacement was used to replace the missing data which does introduce some unavoidable bias into the sample.

Data were not collected in this study regarding the full details of infants' length of hospital stay. Data were available to the researcher on the length of time infants stayed at the NNUH. It is however, possible that they may have been transferred to another hospital following the completion of their treatment at the NNUH, approximately 25% are repatriated to referral units. The NNUH NICU serves a large geographical area and some infants and families would have had to have travelled long distances which may have resulted in their infant being transferred when they were well enough to move to another unit. By not having this data available for this study it may have impacted results when considering associations between fathers' reported levels of PTSS with length of infant hospital stay. It would have been interesting to have assessed any potential differences in PTSS levels in fathers who needed to travel longer distances to the hospital. McFadyen (1994) noted that the move to regional centres of excellence has impacted the distance families have to travel to visit their infants, this is likely to further contribute to the overall stressful experience and you might therefore expect to see greater levels of PTSS in fathers who have had to travel longer distances.

4.6 Theoretical Implications

It has been noted that research into PTSD following childbirth in women is predominantly atheoretical (McKenzie-McHarg et al., 2015), the findings of the current study would support future research into understanding the theoretical underpinnings of this phenomenon for both men and women. Increased understanding of theoretical underpinnings will assist in considering appropriate clinical interventions and possibly screening.

An issue raised by McKenzie-McHarg et al. (2015) is whether conceptualising traumatic childbirth experiences as a discreet diagnostic category is appropriate or if it should be considered on a continuum of distress. It has been discussed in relation to the benefits of PTSD diagnoses in terms of access to treatment. However, clinically significant symptoms are also important and difficulties arise when they do not meet diagnostic criteria and thus potentially affect the treatment that may be available (Ayers, Joseph, McKenzie-McHarg, Slade, & Wijma, 2008). Subclinical symptoms can still negatively impact women's functioning, for which intervention may be important (McKenzie-McHarg et al., 2015). The changes in the diagnostic criteria with the introduction of DSM-5 (APA, 2013) may have further implications for this with a debate that the new criteria which has involved the removal of criterion A2 (the individual has to respond to the event with "intense fear, helplessness or horror") may result in an increase of women meeting diagnostic criteria (see Ayers, 2013). The removal of this specification of the emotional response that was previously required for a PTSD diagnosis may also have implications for the number of fathers meeting diagnostic criteria. Given that the current study found fathers of VLBW infants to be experiencing similar levels of PTSS two to four years postpartum as mothers of VLBW infants, it would suggest that these diagnostic issues are equally applicable to men as women. The current study was not able to assess impact on functioning, but scores on the IES-R could be indicative of distress that would benefit from intervention, regardless of diagnostic classification.

Ayers and Ford (2009) note that in women the research in the UK has been interested in social and cognitive risk factors in the application of PTSD theories to childbirth; the former they view as important and highly relevant. The models which have been developed to explain postnatal PTSD in women include; Allen's (1998) which emphasises the interrelationship between feeling out of control and an inability to seek help during childbirth,

Ayers' (2004) outlined psychological risk factors, leading to the appraisal of the birth as traumatic by the woman, and Ford, Ayers, and Bradley's (2010) applied Ehlers and Clark's (2000) model to PTSS following childbirth with the addition of consideration of social support. The current study indicates that PTSS is a difficulty for fathers as well as mothers and the development of theoretical frameworks should consider their applicability to both parents. The development of theoretical frameworks could help to point towards suitable potential effective interventions.

It has been suggested that the potential for VLBW infants to suffer cognitive delay and additional illnesses can serve as triggers to remind parents of experiences during the NICU period (Barry & Singer, 2001). The current study is not able to inform about this theory but given that PTSS may be experienced by some fathers up to four years postpartum in the current sample, future research might investigate the possible association of ongoing difficulties and parental mental health to consider if this might be a possible explanation.

4.7 Implications for Further Research

The limited literature in the field of postnatal PTSS consistently points to the importance of including fathers in this research area (see Hollywood & Hollywood, 2011). The current study further supports this view with the results indicating fathers of VLBW infants are just as likely to be affected by PTSS as mothers of VLBW infants. The literature reviewed within this study would suggest that progress has been made in terms of addressing the needs of fathers and it is important that this continues so mothers and fathers have an equal place in the research moving forwards. In line with this and the specified need for parallel investigations of mothers and fathers (Phares, 1996a), it would be useful to build on the pilot nature of both the current study and the one by Åhlund et al. (2009) by investigating a large sample of parents concurrently. Replications of the studies should use the same measures and take them at similar times postpartum in order to make meaningful

comparisons. Researching parents concurrently would also enable exploration of potential impacts of if both parents are suffering with PTSS compared to those where only one parent is. There is evidence to suggest high levels of co-morbidity of postpartum PTSD in couples (Iles et al., 2011). Additionally, there may possibly be the potential for fathers to have elements of secondary trauma as a result of being influenced by the mother's experience. In order to encourage and increase participation of fathers in research in this area it may be worth highlighting to them that they have been underrepresented in research thus far, which has been in part due to a lack of participation of fathers, and therefore has limited the understanding of their experiences. Additionally qualitative methodologies could be employed to look at the experience of fathers of trauma. The use of mixed methods designs could help to unravel the complexities that have been highlighted in this study with regards to whether PTSS is related to the experience of the birth or the NICU hospitalisation.

Although the cross-sectional design of this study reduced participant burden it also had the negative effect of not being able to determine the course of development of PTSS or the experience of trauma over time. Future studies would benefit from doing longer term follow-up, including baseline measures taken during pregnancy. This could help to elucidate particularly risky time periods and thus may indicate potential risk factors that could be appropriately targeted for intervention. Additionally the current literature does not provide indications of possible risk factors in the development of paternal postnatal PTSS and the current study was not able to fully explore potential influencing factors, such as infant demographics, due to small sample numbers. Research focusing on predictive factors would aid with the development of appropriate intervention programmes.

Studies should aim to recruit larger sample sizes to increase the power to detect small effect sizes and increase the ecological validity of studies. Studies should use homogenous samples of premature infants, Borghini et al. (2006) highlight the importance of this because

of the differences that have been found in parents of infants where their baby was more severely ill. There may be specific differences associated with degrees of prematurity, birth weight and types of delivery. A lot of the studies that have been reviewed have investigated parents of premature babies as a heterogeneous group and this could explain some of the conflicting findings. Candelori et al. (2015) highlighted the need to combine self-report measures with clinical interviews conducted by trained psychologist to deepen our understanding of fathers' responses. Qualitative research could add to the understanding of the trauma experiences of fathers over time.

4.8 Conclusion

Research into postnatal mental health in men has in recent years given greater focus to the possibility of the experience of PTSD and PTSS following the birth of their children. Some focus has been given to the experience of fathers whose infants were admitted to the NICU. The current study contributes to this literature, specifically addressing the paucity of research which has investigated fathers of VLBW infants, and assessed the long-term psychological consequences of having a VLBW infant. This study drew upon research conducted in mothers of VLBW infants and psychological models of PTSD to explore the prevalence of PTSS in this sample two to four years postpartum. The results of this study indicate that fathers can experience PTSS following the birth of their VLBW infant and that in this sample, the levels of PTSS were significantly higher than they were in fathers of term infants. Additionally, fathers of VLBW infants have similarly high levels of PTSS at two to four years postpartum as present in mothers. The conclusions of this study, do however, need to be considered with caution due to the limitations documented. However, they do suggest increased psychological support is needed for fathers following the birth of a VLBW infant. The psychological experience of fathers of VLBW infants are likely to be compounded by the experience of the premature birth and hospital admission of their infants, this is over and

above what may be experienced by fathers of term infants where the birth was experienced as traumatic, where PTSS has also been observed to a greater degree than in fathers of term infants. Future research into what is perceived by fathers to be the most traumatic aspect of the birth and hospitalisation of their VLBW infant would be of particular interest. Is it the birth itself, the life threatening nature of prematurity, the NICU environment or potential disability that is perceived as most traumatic? Additionally it has been highlighted that there is a need for both longitudinal research in to the experience of the trauma as well as the symptoms of trauma. The use of qualitative methodologies will add to this literature.

Despite the challenge of including fathers in research, this study clearly highlights the need to continue to involve fathers and the importance of analysing them separately from mothers for effects, rather than the current frequent situation where mothers and fathers results are analysed together, often due to the small sample sizes of fathers. The current study's small sample size further highlights the difficulties of including fathers in this area of research, but suggestions have been highlighted as to how this might be improved. Given the literature on the impact of fathers' mental health on the father-infant bond and consequently the emotional and cognitive development of their children, studies aimed at increasing our understanding of fathers' mental health following the birth of their infants is of great importance to not just fathers' emotional well-being, but also to the well-being of their families.

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Appendix A

Details of Recruitment Efforts

Details of Postal Recruitment Efforts

Date	Action	Details
12.05.15	REC application	Calculation determined for recruitment – between 27 and 36 fathers in each group. Estimated 200 fathers of VLBW infants as potential participants
19.05.15	REC approval	
09.07.15	Initial meeting with NNUH NICU Research Nurse and IT Midwife	Participants started to be identified for VLBW group
23.07.15	R & D approval	
18.08.15	167 eligible fathers of VLBW infants identified and invite letters sent – recruitment of this group began	Participants started to be identified for term group
	List of fathers sent to IT Midwife to begin identification of fathers or term infants	
14.09.15 – 26.01.16	Email correspondence regarding identifying list of fathers of term infants	
26.01.16	166 eligible fathers of term infants identified	
02.02.16	Invite letters sent to term fathers – recruitment began of this group	
04.02.16	Thesis extension granted (due to recruitment difficulties)	
10.02.16		18 participant packs for VLBW group completed and returned
10.02.16	Amendment submitted to REC to request approval to send final reminder letter to fathers who had consented to receive a pack but not yet returned them. Research supervision discussion suggested this would maximise recruitment	

March 2016	Amendment accepted by REC and R&D	Final reminder letters sent – strategy used for both VLBW group and term group
31.05.16	Recruitment stopped	Deadline in order to allow enough time to write up thesis
31.05.16	Total viable packs for each group	
	Fathers of VLBW infants	22
	Fathers of term infants	22

Details of Clinic Recruitment Efforts

This recruitment method was available for fathers of VLBW infants only. Clinics occurred once a month, on average, during the study period.

Total Number of Clinics Attended	Number of Eligible Infants Seen in Clinic	Total Number of Eligible Fathers Attending	Total Number of Fathers Agreeing to Take a Pack	Total Number of Completed and Returned Packs
8	18	9	5	4

Appendix B

Impact of Events Scale-Revised

Fathers of Very Low Birth Weight Infants Version

[Participant No. ____]

Impact of Events Scale - Revised

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to the birth of your child in [MONTH, YEAR] and having your child cared for at the Norfolk and Norwich University Hospital Neonatal Intensive Care Unit. How much were you distressed or bothered by these difficulties in the past seven days?

	Not at all	A little bit	Moderately	Quite a bit	Extremely
Any reminder brought back feelings about it	0	1	2	3	4
I had trouble staying asleep	0	1	2	3	4
Other things kept making me think about it	0	1	2	3	4
I felt irritable and angry	0	1	2	3	4
I avoided letting myself get upset when I thought about it or was reminded of it	0	1	2	3	4
I thought about it when I didn't mean to	0	1	2	3	4
I felt as if it hadn't happened or wasn't real	0	1	2	3	4
I stayed away from reminders about it	0	1	2	3	4
Pictures about it popped into my mind	0	1	2	3	4
I was jumpy and easily startled	0	1	2	3	4
I tried not to think about it	0	1	2	3	4
I was aware that I still had a lot of feelings about it, but I didn't deal with them	0	1	2	3	4
My feelings about it were kind of numb	0	1	2	3	4
I found myself acting or feeling as though I was back at that time	0	1	2	3	4
I had trouble falling asleep	0	1	2	3	4

I had waves of strong feelings about it	0	1	2	3	4
I tried to remove it from my memory	0	1	2	3	4
I had trouble concentrating	0	1	2	3	4
Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart	0	1	2	3	4
I had dreams about it	0	1	2	3	4
I felt watchful or on-guard	0	1	2	3	4
I tried not to talk about it	0	1	2	3	4

Fathers of Term Infants Version

[Participant No. ____]

Impact of Events Scale - Revised

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to the birth of your child in [MONTH, YEAR] and having your child cared for at the Norfolk and Norwich University Hospital immediately after the birth. How much were you distressed or bothered by these difficulties in the past seven days?

	Not at all	A little bit	Moderately	Quite a bit	Extremely
Any reminder brought back feelings about it	0	1	2	3	4
I had trouble staying asleep	0	1	2	3	4
Other things kept making me think about it	0	1	2	3	4
I felt irritable and angry	0	1	2	3	4
I avoided letting myself get upset when I thought about it or was reminded of it	0	1	2	3	4
I thought about it when I didn't mean to	0	1	2	3	4
I felt as if it hadn't happened or wasn't real	0	1	2	3	4
I stayed away from reminders about it	0	1	2	3	4
Pictures about it popped into my mind	0	1	2	3	4
I was jumpy and easily startled	0	1	2	3	4
I tried not to think about it	0	1	2	3	4
I was aware that I still had a lot of feelings about it, but I didn't deal with them	0	1	2	3	4
My feelings about it were kind of numb	0	1	2	3	4
I found myself acting or feeling as though I was back at that time	0	1	2	3	4
I had trouble falling asleep	0	1	2	3	4
I had waves of strong feelings about it	0	1	2	3	4

I tried to remove it from my memory	0	1	2	3	4
I had trouble concentrating	0	1	2	3	4
Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart	0	1	2	3	4
I had dreams about it	0	1	2	3	4
I felt watchful or on-guard	0	1	2	3	4
I tried not to talk about it	0	1	2	3	4

Appendix C

Generalised Anxiety Disorder-Seven Item Scale

[Participant No. ____]

GAD-7

Over the LAST TWO WEEKS, how often have you been bothered by the following problems.
Please circle your answer.

	Not at all	Several days	More than half the days	Nearly every day
Feeling nervous, anxious or on edge	0	1	2	3
Not being able to stop or control worrying	0	1	2	3
Worrying too much about different things	0	1	2	3
Trouble relaxing	0	1	2	3
Being so restless that it is hard to sit still	0	1	2	3
Becoming annoyed or irritable	0	1	2	3
Feeling afraid as if something awful might happen	0	1	2	3

Appendix D

Patient Health Questionnaire-9 Depression Scale

[Participant No. ____]

Patient Health Questionnaire - 9

Over the LAST TWO WEEKS, how often have you been bothered by any of the following problems. Please circle your answer.

	Not at all	Several days	More than half the days	Nearly every day
Little interest or pleasure in doing things	0	1	2	3
Feeling down, depressed, or hopeless	0	1	2	3
Trouble falling or staying asleep, or sleeping too much	0	1	2	3
Feeling tired or having little energy	0	1	2	3
Poor appetite or overeating	0	1	2	3
Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
Trouble concentrating on things such as reading the newspaper or watching television	0	1	2	3
Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

Appendix E

ENRICHD Social Support Inventory

[Participant No. ____]

ENRICHD Social Support Instrument

Please read the following questions and circle the response that most closely described the situation when you child was born in [MONTH, YEAR] and during the time they were in hospital.

	None of the time	A little of the time	Some of the time	Most of the time	All the time
Was there someone available to you whom you could count on to listen to you when you needed to talk?	1	2	3	4	5
Was there someone available to give you good advice about a problem?	1	2	3	4	5
Was there someone available to you who shows you love and affection?	1	2	3	4	5
Was there someone available to help you with daily chores?	1	2	3	4	5
Could you count on anyone to provide you with emotional support (talking over problems or helping you make a difficult decision)?	1	2	3	4	5
Did you have as much contact as you would like with someone you feel close to, someone in whom you could trust and confide?	1	2	3	4	5
Were you married or living with a partner?	Yes	No			

Appendix F

Demographic Questionnaire

[Participant No. ____]

Participant and Infant Information

For the purposes of this study, it is helpful if you are able to provide us with particular information about you, your child and your family. If you do not wish to answer a question you may leave it blank. Please answer questions that refer to your child thinking about your child that was born in [MONTH, YEAR]. Please tick the relevant boxes to indicate your responses.

1. What is your age?

☐ 18 – 24

☐ 25 – 29

☐ 30 – 34

☐ 35 – 39

☐ 40 – 44

☐ 45 – 49

☐ 50 +

2. How would you describe your ethnicity?

White

☐ White British (English/Welsh/Scottish/Northern Irish/British) ☐ Irish

☐ European ☐ Traveller ☐ Gypsy

☐ Any other White background (*please specify*) _____

Black

☐ Black British ☐ African ☐ Caribbean

☐ Any other Black background (*please specify*) _____

Asian

☐ Asian British ☐ Indian ☐ Pakistani ☐ Bangladeshi

☐ Chinese

☐ Japanese

☐ Any other Asian background _____

Other ethnic group

☐ Arab

☐ Any other ethnic group (*please specify*) _____

3. a) What was your marital status at the time of the birth of your child?

☐ Married

☐ Civil Partnership

☐ Cohabiting

☐ In a relationship but not living together

☐ Single

☐ Divorced/Separated

b) Has this changed since your child was born?

☐ Yes (*please specify*) _____

☐ No

4. Prior to the birth of your child have you suffered from

☐ depression?

☐ anxiety?

☐ other? *Please specify* _____

☐ none of the above

5. Were you in employment when your child was born?

☐ Yes

☐ No

If 'Yes', please complete Questions 6-9. If 'No', please go to Question 10.

6. Were you in full- or part-time employment?

☐ Full-time

☐ Part-time

7. How much paternity leave were you able to take?

_____ days

8. Did you take leave from work whilst your child was in hospital?

☐ Yes

☐ No

9. Did you take leave from work when your child returned home?

☐ Yes

☐ No

10. Do you currently live with your child?

☐ Yes

☐ No

☐ Sometimes (i.e. weekends) (*please specify*) _____

Appendix G

Postal Invite Letter



Norfolk and Norwich University Hospitals **NHS**
NHS Foundation Trust

Neonatal Intensive Care Unit
Norfolk and Norwich University Hospital
Colney Lane
Norwich
NR4 7UY
Direct Dial 01603 286866

[DATE]

Dear

Re. a Research Study: Emotional experiences of fathers following the birth of their child

Having a baby can be an emotional time, we are writing to you as your baby was born or cared for at the Norfolk and Norwich University hospital in [Month, Year]. We would like to learn more about the fathers around the time of the birth of their baby until they were discharged from the hospital and the memories fathers have of this time.

So far there has been lots of research to find out about the experiences of mothers at this time, but very little on the experiences of *fathers*. We believe that the views of fathers are extremely important and should inform the support that is offered to parents following the birth of their child.

We very much hope that you will feel able to share your own views and thoughts by answering some questions in a short questionnaire (it should take about 25 minutes). The questions will relate to your memories of when your child was born. We hope that the results of our study will help us better understand how fathers feel about the experience of their child being born. Your answers to these questions may help to shape services provided to support fathers. This study will also form the thesis for Amy Alexander's Clinical Psychology Doctorate and if you agree to participate I would like to ask for your consent to her contacting you via post to take part in this study.

If you would be willing to receive a short questionnaire asking about your experiences, please kindly complete the enclosed consent form and return it in the prepaid envelope. All responses to the questionnaire will be kept anonymous. This study has been approved by London- Fulham ethics committee on 19/5/2015. There is no obligation for you to take part in this study and a decision not to take part will not affect the care that you or your child receive from the hospital.

In anticipation, thank you for considering participation in this study.

Kind regards,

Dr Paul Clarke
Consultant Neonatologist

CONSENT TO CONTACT

I.....
have had the invite letter to complete the questionnaire about the birth of my child at the Norfolk and Norwich University Hospital in [Month, Year] and I consent to Amy Alexander contacting me to complete this questionnaire. I understand that any information I give will not be traceable to me and that I give permission for data to be shared with other health care professionals in confidence. I am also aware that I can withdraw from the study at any time for any reason I see fit.

Child's Name: Child's Date of Birth: / /

Father's Address:

.....

.....

.....

Father's Name:

Signature:

Appendix H

Covering Letter



DATE

Dear

Emotional experiences of fathers following the birth of their child

Thank you very much for agreeing to take part in this study. We now enclose the questionnaires for you to complete.

This pack contains a detailed **Information Sheet** explaining the research, a **Consent Form** and a **set of questionnaires**. Please answer as many of the questions as you can, but don't worry if you don't want to answer some questions, please still return the questionnaires as any information will be very valuable.

The questionnaires ask about the birth of your baby and the period leading up to their discharge from hospital. The questions ask about your current opinions and feelings about the memories of these events. We would be grateful if you could try to return the completed questionnaires within the next two weeks. We understand that this will be a busy time for you so in case you forget we will send a gentle reminder letter if we don't receive the questionnaire back in four weeks.

If you do not wish to take part it would be helpful if you could return the questionnaire pack blank.

If reflecting on the birth of your baby and the time around this raises issues that you would like to discuss, please either contact us or your GP. Please do not feel obliged to complete the questionnaires, a decision not to take part will not affect your or your infant's care from the hospital.

In anticipation, thank you for your participation in this study.

Yours sincerely,

Amy Alexander
Trainee Clinical Psychologist

Dr Paul Clarke
Consultant Neonatologist

Appendix I

Postal Participant Information Sheet



Participant Information Sheet

Emotional experiences of fathers following the birth of their child

You are being invited to take part in a research study about the experience of fathers whose babies were born between 2011 and 2013. Before you decide if you would like to take part we would like you to understand why the research is being done and what it would involve for you. Please take time to read the following information and take time to decide if you would like to take part.

What is the purpose of the study?

The birth of a baby can be experienced as a traumatic event by some fathers. We are investigating if there is a difference in the long-term psychological impact between fathers whose babies were born at term, and fathers whose babies were of very low birth weight. The findings of this study will help us to understand more about the experiences of fathers and to identify better ways of helping and supporting fathers.

The study is being completed as part of the researcher's Doctorate in Clinical Psychology at the University of East Anglia (UEA) where the chief investigator is studying as a trainee clinical psychologist.

Why have I been invited to take part?

As you are a father of a baby born and/or cared for between 2011 and 2013 at Norfolk and Norwich University Hospital and we would very much like to hear about your experience.

What does the study involve?

The study involves filling out five short questionnaires. One asks for some basic information about you and your child; one asks about the social support you received at the time of the birth of your child and the other three ask about any current distress and low mood specifically related to the birth of your baby and period of care in hospital before going home. The questionnaires take approximately 25 minutes to complete in total. Additionally, relevant information regarding your baby's health between birth and discharge home will be looked at in your baby's medical notes.

What do I need to do to take part?

If you decide to take part in the study you will need to sign the enclosed consent sheet and complete the questionnaires then post them back to us using the pre-paid envelope provided. You will not be contacted again once you have returned the questionnaires and consent form. The questionnaires will be handled anonymously and the information will be analysed and then written about in an article without your name being mentioned.

Do I have to take part?

No. It is up to you to decide whether or not to take part. Your participation is optional. If you decide not to take part, that decision will not affect the care you or your child receive in any way. If you choose not to take part, please return the questionnaires and unsigned consent form in the pre-paid envelope, so that we will know you declined to take part and we will not contact you again.

How will the information I provide be kept confidential?

All information you provide will be securely stored and kept anonymous and confidential. All information collected about you or your baby will have your name and address removed so you cannot be recognised from it. Your own GP will not be notified of your participation in the study.

What will happen to the results of the research study?

The results of this research will be written up as a thesis as part of the researcher's Doctorate in Clinical Psychology. All information will be reported as anonymous data. The results will also be written into articles and potentially published in academic journals so that others can learn from the findings. We will be pleased to send you a summary of the results in due course if you indicate this on the consent form.

The information collected in relation to the study will be kept for 10 years at the University of East Anglia in line with the UEA Research Data Management Policy.

Are there any benefits of taking part?

This study will improve our understanding of the long-term psychological impact on fathers relating to the birth of their baby. The study may identify specific groups of fathers who need extra support and so may benefit fathers in the future.

Are there any disadvantages or risks of taking part?

It is possible that some of the questions may bring back upsetting memories. If this is the case you can stop completing the questionnaire. Some people may experience distress or concerns after completing the questionnaires. Support and advice is available through contacting:

- Your GP
- Bliss, a charity that supports premature and sick babies and their families
 - The family support helpline is 0500 618 140
 - The website is www.bliss.org.uk
 - There is a Bliss Family Care Coordinator based at NNUH Neonatal Intensive Care Unit
- Samaritans is a charity which provides confidential emotional support for people who are experiencing feelings of distress, despair or suicidal thoughts.
 - The support helpline is 08457 90 90 90

If your responses on the questionnaires indicate high levels of stress or anxiety, we will contact you to let you know this and would advise you to consider seeking support from your GP.

Complaints

If you have any concerns about this study please feel free to contact Professor Ken Laidlaw Norwich Medical School, Room 2.11, Elizabeth fry Building, University of East Anglia, Norwich NR4 7TJ. Telephone: 01603 593600. Or Dr Paul Clarke, Norfolk and Norwich University Hospitals NHS Foundation Trust, Colney Lane, Norwich NR4 7UY. Telephone: 01603 286342.

Who is organising and funding the research?

This research is organised by Amy Alexander, Ms Kiki Mastroyannopoulou and Dr Paul Clarke and is funded by the University of East Anglia Doctoral Programme in Clinical Psychology, Danone Nutricia Early Life Nutrition and Chiesi Limited.

Who has reviewed this study?

Before any research goes ahead in the NHS it needs to be checked by an independent group of people called a Research Ethics Committee. Their job is to ensure that any proposed research is ethical and to protect the safety, rights, well-being and dignity of participants. This study has been reviewed and was given a favourable opinion by the NRES Committee, London-Fulham.

Further information

If you have any questions, or would like more information, please contact the chief investigator or primary supervisor:

Chief investigator: Amy Alexander
Trainee Clinical Psychologist

Department of Psychological Sciences
Norwich Medical School
University of East Anglia
Norwich
NR4 7TJ

Email: Amy.L.Alexander@uea.ac.uk

Primary supervisor: Ms Kiki
Mastroyannopoulou
Clinical Lecturer

Department of Psychological Sciences
Norwich Medical School
University of East Anglia
Norwich
NR4 7TJ

Email: k.mastroyannopoulou@uea.ac.uk

Phone: 01603 593691

*Thank you for taking time to read this information sheet, please keep this information
for your records.*

Appendix J

Participant Consent Form



Consent Form P_Version 3.1_28.08.15

CONSENT FORM

Title of Project: Emotional experiences of fathers following the birth of their child

Chief Investigator: Amy Alexander, Trainee Clinical Psychologist

Please initial
all boxes

1. I confirm that I have read and understand the information sheet dated 28.08.15 (version 3.1) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐
3. I agree that my infant's medical notes may be looked at by the clinical researchers based at Norfolk and Norwich University Hospital to gather relevant information regarding my baby's health between birth and discharge home. ☐
4. I agree to take part in the above study. ☐
5. I wish to be informed of the study findings in the future.

Yes / No (please circle)

_____	_____	_____
Name of Participant	Date	Signature
<u>Amy Alexander</u>	_____	_____
Chief Investigator	Received on	Signature

Appendix K

Reminder Letter



Department of Psychological Sciences
Norwich Medical School
University of East Anglia
Norwich
NR4 7TJ

Email: amy.l.alexander@uea.ac.uk

[DATE]

Dear

Emotional experiences of fathers following the birth of their child

We recently sent you a participant pack for this research study. We have not yet received back from you a completed set of questionnaires.

We remain hopeful that you might be willing to join this study and hope that you do not mind us sending this brief reminder. We will be very grateful if you will consider participating and hope that you will agree. We would very much value your responses.

If you prefer not to participate in this study please let us know by returning the blank questionnaires and we will not trouble you again.

Thank you for taking the time to consider this study.

Yours sincerely,

Amy Alexander
Trainee Clinical Psychologist

Dr Paul Clarke
Consultant Neonatologist

Appendix L

Final Reminder Letter



Department of Psychological Sciences
Norwich Medical School
University of East Anglia
Norwich
NR4 7TJ

Email: amy.l.alexander@uea.ac.uk

[DATE]

Dear

Research Study: Emotional experiences of fathers following the birth of their child

Thank you for previously letting us know of your interest in hearing more about this study and for expressing an interest in participating.

We previously sent out a participant pack containing the questionnaires. We have not yet received any completed questionnaires back from you. We remain hopeful that you might still be willing to take part in this study so that we can better understand the needs of fathers. We would very much value your participation. In the pack you originally received we said we would send you a gentle reminder and we just wanted to send you this further and final reminder to give you the opportunity to participate.

We enclose another participant pack in case you are willing to take part in this study.

- **If you are willing to take part, please complete and return the questionnaires and consent form in the enclosed pre-paid envelope**
- **If you do not wish to take part you need to do nothing and we will not contact you again.**

Thank you for taking the time to consider this study.

Yours sincerely,

Amy Alexander
Trainee Clinical Psychologist

Dr Paul Clarke
Consultant Neonatologist

P.S. Please ignore this letter and accept our apologies if you have returned the questionnaires in the last few days.

Appendix M

Clinic Invite Letter



Neonatal Intensive Care Unit
Norfolk and Norwich University Hospital
Colney Lane
Norwich
NR4 7UY

Direct Dial 01603 286866

STUDY INVITATION

Emotional experiences of fathers following the birth of their child

Dear dad,

Having a baby can be an emotional time, we are writing to you as we wish to understand more about fathers around the time of the birth of their baby until they were discharged from the hospital and the memories fathers have of this time.

So far there has been lots of research to find out about the experiences of mothers at this time, but very little on the experiences of *fathers*. We believe that the views of fathers are extremely important and should inform the support that is offered to parents following the birth of their child. We very much hope that you will feel able to share your own views and thoughts by answering some questions in a short questionnaire (it should take about 25 minutes). These questions will relate to your memories of when your child was born. We hope that the results of our study will help us better understand how fathers feel about the experience of their child being born. Your answers to these questions may help to shape services provided to support fathers. This study will also form the thesis for Amy Alexander's Clinical Psychology Doctorate.

If you would be willing to complete a short questionnaire asking about your experiences, please see Amy Alexander after your clinic appointment. Questionnaires can be completed here at the hospital or taken home and returned in a prepaid envelope. All responses to the questionnaire will be kept anonymous. This study has been approved by the London-Fulham Research Ethics Committee. There is no obligation for you to take part in this study and a decision not to take part will not affect yours or your infant's care from the hospital.

In anticipation, thank you for considering participation in this study.

Kind regards,

Dr Paul Clarke
Consultant Neonatologist

Appendix N

Clinic Participant Information Sheet



Participant Information Sheet

Emotional experiences of fathers following the birth of their child

You are being invited to take part in a research study about the experience of fathers whose babies were born between 2011 and 2013. Before you decide if you would like to take part we would like you to understand why the research is being done and what it would involve for you. Please take time to read the following information and take time to decide if you would like to take part.

What is the purpose of the study?

The birth of a baby can be experienced as a traumatic event by some fathers. We are investigating if there is a difference in the long-term psychological impact between fathers whose babies were born at term, and fathers whose babies were of very low birth weight. The findings of this study will help us to understand more about the experiences of fathers and to identify better ways of helping and supporting fathers.

The study is being completed as part of the researcher's Doctorate in Clinical Psychology at the University of East Anglia (UEA) where the chief investigator is studying as a trainee clinical psychologist.

Why have I been invited to take part?

As you are a father of a baby born and/or cared for between 2011 and 2013 at Norfolk and Norwich University Hospital and we would very much like to hear about your experience.

What does the study involve?

The study involves filling out five short questionnaires. One asks for some basic information about you and your child; one asks about the social support you received at the time of the birth of your child and the other three ask about any current distress and low mood specifically related to the birth of your baby and period of care in hospital before going home. The questionnaires take approximately 25 minutes to complete in total. Additionally, relevant information regarding your baby's health between birth and discharge home will be looked at in your baby's medical notes.

What do I need to do to take part?

If you decide to take part in the study you will need to sign the enclosed consent sheet and complete the questionnaires then either hand them to Amy Alexander who will be available at your clinic appointment or post them back to us using the pre-paid envelope provided. You will not be contacted again once you have returned the questionnaires and consent form. The questionnaires will be handled anonymously and the information will be analysed and then written about in an article without your name being mentioned.

Do I have to take part?

No. It is up to you to decide whether or not to take part. Your participation is optional. If you decide not to take part, that decision will not affect the care you or your child receive in any way. If you choose not to take part, please return the questionnaires and unsigned consent form, so that we will know you decline to take part and we will not contact you again.

How will the information I provide be kept confidential?

All information you provide will be securely stored and kept anonymous and confidential. All information collected about you or your baby will have your name and address removed so you cannot be recognised from it. Your own GP will not be notified of your participation in the study.

What will happen to the results of the research study?

The results of this research will be written up as a thesis as part of the researcher's Doctorate in Clinical Psychology. All information will be reported as anonymous data. The results will also be written into articles and potentially published in academic journals so that others can learn from the findings. We will be pleased to send you a summary of the results in due course if you indicate this on the consent form.

The information collected in relation to the study will be kept for 10 years at the University of East Anglia in line with the UEA Research Data Management Policy.

Are there any benefits of taking part?

This study will improve our understanding of the long-term psychological impact on fathers relating to the birth of their baby. The study may identify specific groups of fathers who need extra support and so may benefit fathers in the future.

Are there any disadvantages or risks of taking part?

It is possible that some of the questions may bring back upsetting memories. If this is the case you can stop completing the questionnaire. Some people may experience distress or concerns after completing the questionnaires. Support and advice is available through contacting:

- Your GP
- Bliss is a charity that supports premature and sick babies and their families
 - The family support helpline is 0500 618 140
 - The website is www.bliss.org.uk
 - There is a Bliss Family Care Coordinator based at NNUH on the Neonatal Intensive Care Unit.
- Samaritans is a charity which provides confidential emotional support for people who are experiencing feelings of distress, despair or suicidal thoughts.
 - The support helpline is 08457 90 90 90

If your responses on the questionnaires indicate high levels of stress or anxiety, we will contact you to let you know this and would advise you to consider seeking support from your GP.

Complaints

If you have any concerns about this study please feel free to contact Professor Ken Laidlaw Norwich Medical School, Room 2.11, Elizabeth fry Building, University of East Anglia, Norwich NR4 7TJ. Telephone: 01603 593600. Or Dr Paul Clarke, Norfolk and Norwich University Hospitals NHS Foundation Trust, Colney Lane, Norwich NR4 7UY. Telephone: 01603 286342.

Who is organising and funding the research?

This research is organised by Amy Alexander, Ms Kiki Mastroyannopoulou and Dr Paul Clarke and is funded by the University of East Anglia Doctoral Programme in Clinical Psychology, Danone Nutricia Early Life Nutrition and Chiesi Limited.

Who has reviewed this study?

Before any research goes ahead in the NHS it needs to be checked by an independent group of people called a Research Ethics Committee. Their job is to ensure that any proposed research is ethical and to protect the safety, rights, well-being and dignity of participants. This study has been reviewed and was given a favourable opinion by the NRES Committee, London-Fulham.

Further information

If you have any questions, or would like more information, please contact the chief investigator or primary supervisor:

Chief investigator: Amy Alexander
Trainee Clinical Psychologist

Department of Psychological Sciences
Norwich Medical School
University of East Anglia
Norwich
NR4 7TJ
Email: Amy.L.Alexander@uea.ac.uk

**Primary supervisor: Ms Kiki
Mastroyannopoulou**
Clinical Lecturer

Department of Psychological Sciences
Norwich Medical School
University of East Anglia
Norwich
NR4 7TJ
Email: k.mastroyannopoulou@uea.ac.uk
Phone: 01603 593691

*Thank you for taking time to read this information sheet, please keep this information
for your records.*

Appendix O

Ethical Approval



NRES Committee London - Fulham

Barlow House
3rd Floor, 4 Minshull Street
Manchester
M1 3DZ

19 May 2015

Miss Amy L. Alexander
Trainee Clinical Psychologist
Cambridgeshire and Peterborough Foundation NHS Trust
Department of Psychological Sciences
Norwich Medical School
University of East Anglia, Norwich
NR4 7TJ

Dear Miss Alexander

Study title:	Posttraumatic stress symptoms in fathers of very low birth weight infants two to four years postpartum
REC reference:	15/LO/0947
Protocol number:	N/A
IRAS project ID:	161516

The Proportionate Review Sub-committee of the NRES Committee London - Fulham reviewed the above application on 18 May 2015.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this favourable opinion letter. The expectation is that this information will be published for all studies that receive an ethical opinion but should you wish to provide a substitute contact point, wish to make a request to defer, or require further information, please contact the REC Manager, Anna Bannister, nrescommittee.london-fulham@nhs.net. Under very limited circumstances (e.g. for student research which has received an unfavourable opinion), it may be possible to grant an exemption to the publication of the study.

Ethical opinion

On behalf of the Committee, the sub-committee gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, subject to the conditions specified below.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

A Research Ethics Committee established by the Health Research Authority

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations.

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publicly accessible database. This should be before the first participant is recruited but no later than 6 weeks after recruitment of the first participant.

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to request a deferral for study registration within the required timeframe, they should contact hra.studyregistration@nhs.net. The expectation is that all clinical trials will be registered, however, in exceptional circumstances non registration may be permissible with prior agreement from NRES. Guidance on where to register is provided on the HRA website.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion").

Approved documents

The documents reviewed and approved were:

<i>Document</i>	<i>Version</i>	<i>Date</i>
Covering letter on headed paper	1	01 May 2015
Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) [Indemnity Insurance Letter from Sponsor]	1	11 May 2015
GP/consultant information sheets or letters [Letter Advising Participants to Seek Support]	1	03 February 2015
IRAS Checklist XML [Checklist_12052015]		12 May 2015
Letters of invitation to participant [Invite Letter for Postal Recruitment]	3	22 April 2015
Letters of invitation to participant [Invite Letter for Clinic Recruitment]	3	22 April 2015
Letters of invitation to participant [Covering Letter for Questionnaire Packs]	3	22 April 2015

A Research Ethics Committee established by the Health Research Authority

Letters of invitation to participant [Reminder Letter]	2	03 February 2015
Non-validated questionnaire [Demographic Questionnaire]	4	03 February 2015
Other [Secondary Academic Supervisor's CV]	1	17 January 2015
Participant consent form	3	03 February 2015
Participant information sheet (PIS) [PIS for Postal Recruitment]	3	22 April 2015
Participant information sheet (PIS) [PIS for Clinic Recruitment]	2	22 April 2015
REC Application Form [REC_Form_11052015]		11 May 2015
Referee's report or other scientific critique report [Internal Review of Proposal - Markers Feedback]	N/A	12 November 2014
Research protocol or project proposal [Study Protocol]	2	22 April 2015
Summary CV for Chief Investigator (CI)	1	02 March 2015
Summary CV for supervisor (student research) [Primary Academic Supervisors CV]		
Validated questionnaire [IES-R for VLBW Fathers]	1	03 February 2015
Validated questionnaire [IES-R for Term Fathers]	1	03 February 2015
Validated questionnaire [ENRICH Social Support Inventory]	1	03 February 2015

Membership of the Proportionate Review Sub-Committee

The members of the Sub-Committee who took part in the review are listed on the attached sheet.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document "After ethical review – guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: <http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/>

HRA Training

We are pleased to welcome researchers and R&D staff at our training days – see details at
<http://www.hra.nhs.uk/hra-training/>

With the Committee's best wishes for the success of this project.

15/LO/0947

Please quote this number on all correspondence

Yours sincerely

PP N. Griffin

On behalf of Alternate Vice Chair
The Rev'd Nigel Griffin

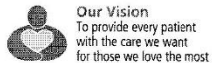
Email: nrescommittee.london-fulham@nhs.net

Enclosures: *After ethical review – guidance for researchers*

Copy to: *Mrs Sue Steel
Karen Baucutt, Research and Development, Level 3 East*

Appendix P

NNUH Research and Development Approval



Norfolk and Norwich University Hospitals **NHS**
NHS Foundation Trust

Ms Amy Alexander
Department of Psychological Sciences
Norwich Medical School
University of East Anglia,
Norwich
NR4 7TJ

Research & Development Office
Level 3 East
Norfolk & Norwich University Hospitals NHS Foundation Trust
Colney Lane
Norwich
NR4 7UY

direct dial: 01603 287806
direct fax: 01603 289800
e-mail: rdoffice@nnuh.nhs.uk
website: www.nnuh.nhs.uk

23/07/2015

Dear Amy Alexander

Re:

R&D Reference Number: 2015PAED01S (05-01-15)

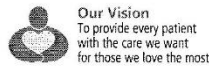
Project Title: The Prevalence of Post-Traumatic Stress Symptoms in Fathers of Very Low Birth Weight Infants Two to Four Years Postpartum

Sponsor: University of East Anglia

I am pleased to inform you that the above Non CTIMP project has been given full NHS permission for research at Norfolk & Norwich University Hospitals NHS Foundation Trust.

This NHS permission for research has been granted on the basis described in the application form, protocol and supporting documentation as listed below:

Document		Version No	Date
Protocol		2	22/04/2015
Ethics approval			19/05/2015
Letter (Support)		1	03/02/2015
Letter of invitation	Invite letter for postal recruitment	3	22/04/2015
Letter of invitation	Invite letter for clinic recruitment	3	22/04/2015
Letter	Covering letter for Questionnaire packs	3	22/04/2015
Letter	Reminder Letter	2	03/02/2015
Questionnaire	Demographics	4	03/02/2015
Consent Form		3	03/02/2015
PIS	for Postal Recruitment	3	22/04/2015
PIS	for Clinic recruitment	2	22/04/2015
Questionnaire	IES-R for VLBW Fathers	1	03/02/2015
Questionnaire	IES-R for Term Fathers	1	03/02/2015
Questionnaire	ENRICHHD	1	03/02/2015
SSI Form			17/07/2015



Norfolk and Norwich University Hospitals **NHS**
NHS Foundation Trust

The agreed total local recruitment target for your study is 72 participants.


To support requirements of the National Institute of Health Research (NIHR) we will be monitoring and publishing outcomes of recruitment into your study. This includes benchmarking against a 70 day period from the time of receipt of a valid research application to this time of recruitment of the first patient for your study.

The date of receipt of a valid application for this study is 17/07/2015 and the benchmark of 70 days to recruit the first patient is 25/09/2015.

The investigator agrees to notify the R&D department when the first patient is enrolled/consented into the study. Wherever the duration exceeds 70 days of the Trust receiving a valid research application, the Investigator will be expected to explain the reason for the delay in writing.

If you have any queries regarding this or any other project please contact Karen Baucutt, Research Facilitator, at the above address. Please note, the reference number for this study is 2015PAED01S (05-01-15) and this should be quoted on all correspondence.

Yours sincerely


Professor Marcus Flather
R&D Director

Appendix Q

Ethical and NNUH Research and Development Approval for First Substantial Amendment



Telephone: 0161 625 7434

14 September 2015

Miss Amy L Alexander
Trainee Clinical Psychologist
Cambridgeshire and Peterborough Foundation NHS Trust
Department of Psychological Sciences
Norwich Medical School
University of East Anglia, Norwich
NR4 7TJ

Dear Miss Alexander

Study title: Posttraumatic stress symptoms in fathers of very low birth weight infants two to four years postpartum
REC reference: 15/LO/0947
Protocol number: N/A
Amendment number: 1
Amendment date: 28 August 2015
IRAS project ID: 161516

- Change in clinical cut off levels on both the GAD7 and PHQ9
- Add funders to the information sheets
- Additionally, logos for the University of East Anglia and the Norfolk and Norwich University Hospitals NHS Foundation Trust's Jenny Lind Hospital (where the Neonatal Intensive Care Unit this study is being conducted at) has been added to all documentation

The above amendment was reviewed the Sub-Committee in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

The Committee queried on whether a letter will go out to high stress score patients. The schedule suggests that all the data is now collected so the researcher may now need to send letters to a few people who did their questionnaires months ago. The Committee queried perhaps the letter needs to explain the change in the protocol to these few participants.

The Committee also spotted a typo on page 8 of the protocol, 4th line from bottom should read For fathers of term infants.

You submitted an amended protocol and explained that at the current time no data has been collected. The Research and Development approval from the NNUH was not given until the

23rd July. Currently the NICU Research Nurse has only recently finished identifying the fathers for whom invite letters need to be sent to, these letters have begun to be sent. You have attended two clinics as per the protocol, but no fathers were in attendance. Therefore, no participant packs have yet been distributed to any potential participants and no questionnaires have been completed. Therefore the change to protocol just effects who you would send the letters to following the commencement of data collection.

The Committee were happy with the explanation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Notice of Substantial Amendment (non-CTIMP)	1	28 August 2015
Participant information sheet (PIS) [Clinic]	2.1	28 August 2015
Participant information sheet (PIS) [Postal]	3.1	28 August 2015
Research protocol or project proposal	2.2	11 September 2015

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at <http://www.hra.nhs.uk/hra-training/>

15/LO/0947:	Please quote this number on all correspondence
--------------------	---

Yours sincerely



Signed on behalf of:

Dr Charles Mackworth-Young
Chairman

E-mail: nrescommittee.london-fulham@nhs.net

Enclosures: *List of names and professions of members who took part in the review*

Copy to: *Karen Baucutt, Research and Development, Level 3 East*
 Mrs Sue Steel

NNUH No Objection Substantial Amendment 01 2015Paed01S - Amy Alexander (M... Page 1 of 1

NNUH No Objection Substantial Amendment 01 2015Paed01S

BAUCUTT KAREN (RM1) Norfolk and Norwich University Hospital <KAREN.BAUCUTT@nnuh.nhs.uk>

Mon 14/09/2015 15:48

To: Amy Alexander (MED) <Amy.L.Alexander@uea.ac.uk>;

Cc: STEEL SUSAN (RM1) Norfolk and Norwich University Hospital <SUSAN.STEEL@nnuh.nhs.uk>; FEW KAREN J (RM1) Norfolk and Norwich University Hospital <karenj.few@nnuh.nhs.uk>; PLAYNE LAURA (RM1) Norfolk and Norwich University Hospital <LAURA.PLAYNE@nnuh.nhs.uk>;

Dear Amy

Re:

R&D Reference Number: 2015PAED01S (05-01-15)

Project Title: The Prevalence of Post-Traumatic Stress Symptoms in Fathers of Very Low Birth Weight Infants Two to Four Years Postpartum

Thank you for your correspondence regarding Substantial Amendment 01. It was noted that the amendment has already received a favourable opinion from the London - Fulham Research Ethics Committee.

Following review of the documentation I am pleased to inform you that there is no objection to this amendment.

The documents reviewed are as follows;

- Participant Information Sheet (Clinic) V2.1 28th August 2015
- Participant Information Sheet (Postal) V3.1 28th August 2015
- Project Protocol/Proposal V2.2 11th September 2015

If you have any queries regarding this or any other project please contact me at the above address. Please note, the reference number for this study is **2015PAED01S (05-01-15)** and this should be quoted on all correspondence.

Kind regards

Karen

Karen Baucutt
Research Study and Recruitment Facilitator
Research and Development
Level 3 East
Norfolk and Norwich University Hospitals NHS Foundation Trust
Colney Lane
Norwich
NR4 7UY

Tel: 01603 288437
Fax: 01603 289800

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31/01/2016

Appendix R

Ethical and NNUH Research and Development Approval for Second Substantial Amendment



23 October 2015

Miss Amy L Alexander
Trainee Clinical Psychologist
Cambridgeshire and Peterborough Foundation NHS Trust
Department of Psychological Sciences
Norwich Medical School
University of East Anglia, Norwich
NR4 7TJ

Dear Miss Alexander

Study title: Posttraumatic stress symptoms in fathers of very low birth weight infants two to four years postpartum
REC reference: 15/LO/0947
Protocol number: N/A
Amendment number: Two
Amendment date: 02 October 2015
IRAS project ID: 161516

The Substantial Amendment proposed to lower the clinical cut-off level to a score of 24 (previously 33) for the IES-R, to trigger a letter written to them advising they seek support from their GP.

The above amendment was reviewed on 22 October 2015 by the Sub-Committee in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

<i>Document</i>	<i>Version</i>	<i>Date</i>
Notice of Substantial Amendment (non-CTIMP)	Two	02 October 2015
Research protocol or project proposal [PTSS in Fathers Proposal]	2.3- Tracked	02 October 2015

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

A Research Ethics Committee established by the Health Research Authority

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

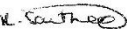
Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at <http://www.hra.nhs.uk/hra-training/>

15/LO/0947:	Please quote this number on all correspondence
--------------------	---

Yours sincerely

PP 

**On behalf of Dr Charles Mackworth-Young
Chair**

E-mail: nrescommittee.london-fulham@nhs.net

Copy to: *Karen Baucutt, Research and Development, Level 3 East
Mrs Sue Steel*

Substantial Amendment 2 NNUH No Objection

BAUCUTT KAREN (RM1) Norfolk and Norwich University Hospital <KAREN.BAUCUTT@nnuh.nhs.uk>

Tue 03/11/2015 13:02

To: Amy Alexander (MED) <Amy.L.Alexander@uea.ac.uk>;

Cc: STEEL SUSAN (RM1) Norfolk and Norwich University Hospital <SUSAN.STEEL@nnuh.nhs.uk>; CLARKE PAUL (RM1) Norfolk and Norwich University Hospital <PAUL.CLARKE@nnuh.nhs.uk>; FEW KAREN J (RM1) Norfolk and Norwich University Hospital <karenj.few@nnuh.nhs.uk>;

Dear Amy

Re:

R&D Reference Number: 2015PAED01S (05-01-15)

Project Title: The Prevalence of Post-Traumatic Stress Symptoms in Fathers of Very Low Birth Weight Infants Two to Four Years Postpartum

Thank you for your correspondence dated 02/10/2015 regarding substantial amendment 02. It was noted that the amendment has already received a favourable opinion from the London - Fulham Research Ethics Committee.

Following review of the documentation I am pleased to inform you that there is no objection to this amendment.

The documents reviewed are as follows;

- Protocol Version 2.3 dated 02/10/2015

If you have any queries regarding this or any other project please contact me. Please note, the reference number for this study is **2015PAED01S (05-01-15)** and this should be quoted on all correspondence.

Best wishes

Karen

Karen Baucutt
Research Study and Recruitment Facilitator
Research and Development
Level 3 East
Norfolk and Norwich University Hospitals NHS Foundation Trust
Colney Lane
Norwich
NR4 7UY

Tel: 01603 288437

Fax: 01603 289800

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31/01/2016

Appendix S

Letter to Participant Advising them to Seek Support



Department of Psychological Sciences
Norwich Medical School
University of East Anglia
Norwich
NR4 7TJ

Email: amy.l.alexander@uea.ac.uk

[DATE]

Dear

I am contacting you in regards to the recent study you participated in which was exploring the emotional experiences of fathers following the birth of their child.

You kindly participated in this study and your time is very much appreciated.

I am writing to you now because your answers to the questionnaires you completed for us indicate that you may be experiencing high levels of stress and anxiety. I would therefore strongly advise that you consider seeking support and advice from your GP.

Support can also be gained from:

- Bliss, a charity that supports premature and sick babies and their families
 - The family support helpline is 0500 618 140
 - The website is www.bliss.org.uk
 - There is a Bliss Family Support worker based at NNUH Neonatal Intensive Care Unit
- Samaritans is a charity which provides confidential emotional support for people who are experiencing feelings of distress, despair or suicidal thoughts.
 - The support helpline is 08457 90 90 90

Yours sincerely,

Amy Alexander
Trainee Clinical Psychologist

Appendix T

Ethical and NNUH Research and Development Approval for Third Substantial Amendment



London - Fulham Research Ethics Committee

Barlow House
3rd Floor, 4 Minshull Street
Manchester
M1 3DZ

Tel: 0207 104 8021

02 March 2016

Miss Amy L Alexander
Trainee Clinical Psychologist
Cambridgeshire and Peterborough Foundation NHS Trust
Department of Psychological Sciences
Norwich Medical School
University of East Anglia, Norwich
NR4 7TJ

Dear Miss Alexander

Study title: Posttraumatic stress symptoms in fathers of very low birth weight infants two to four years postpartum
REC reference: 15/LO/0947
Protocol number: N/A
Amendment number: 3
Amendment date: 05 February 2016
IRAS project ID: 161516

- To include a final reminder letter

The above amendment was reviewed by the Sub-Committee in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

The Sub-Committee requested some changes to the final reminder letter.

Miss Amy Alexander incorporated these changes and submitted an updated letter.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Notice of Substantial Amendment (non-CTIMP)	3	05 February 2016
Other [Final Reminder Letter]	2	29 February 2016
Research protocol or project proposal	2.4	05 February 2016

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at <http://www.hra.nhs.uk/hra-training/>

15/LO/0947:	Please quote this number on all correspondence
--------------------	---

Yours sincerely



Signed on behalf of:
The Rev'd Nigel Griffin
Chair

E-mail: nrescommittee.london-fulham@nhs.net

Enclosures: *List of names and professions of members who took part in the review*

Copy to: *Karen Baucutt, Research and Development, Level 3 East*
 Mrs Sue Steel

NNUH No Objection SA3 2015PAED01S - Amy Alexander (MED)

Page 1 of 1

NNUH No Objection SA3 2015PAED01S

BAUCUTT KAREN (RM1) Norfolk and Norwich University Hospital <KAREN.BAUCUTT@nnuh.nhs.uk>

Tue 15/02/2016 16:31

To: Amy Alexander (MED) <Amy.L.Alexander@uea.ac.uk>;

Cc: CLARKE PAUL (RM1) Norfolk and Norwich University Hospital <PAUL.CLARKE@nnuh.nhs.uk>; FEW KAREN J (RM1) Norfolk and Norwich University Hospital <karenj.few@nnuh.nhs.uk>;

Dear Amy

Re:

R&D Reference Number: 2015PAED01S (05-01-15)

Project Title: The Prevalence of Post-Traumatic Stress Symptoms in Fathers of Very Low Birth Weight Infants Two to Four Years Postpartum

Thank you for your correspondence dated 10/02/2016 regarding Substantial Amendment 03. It was noted that the amendment has already received a favourable opinion from the London - Fulham Research Ethics Committee.

Following review of the documentation I am pleased to inform you that there is no objection to this amendment.

The documents reviewed are as follows;

- Final Reminder Letter V2 29/2/2016
- Protocol V2.4 5/02/2016

If you have any queries regarding this or any other project please contact me. Please note, the reference number for this study is **2015PAED01S (05-01-15)** and this should be quoted on all correspondence.

Best wishes

Karen

Karen Baucutt
Research Study and Recruitment Facilitator
Research and Development
Level 3 East
Norfolk and Norwich University Hospitals NHS Foundation Trust
Colney Lane
Norwich
NR4 7UY

Tel: 01603 288437

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Appendix U

Histograms for Outcome Measures

Figure U1. VLBW Fathers' IES-R Scores

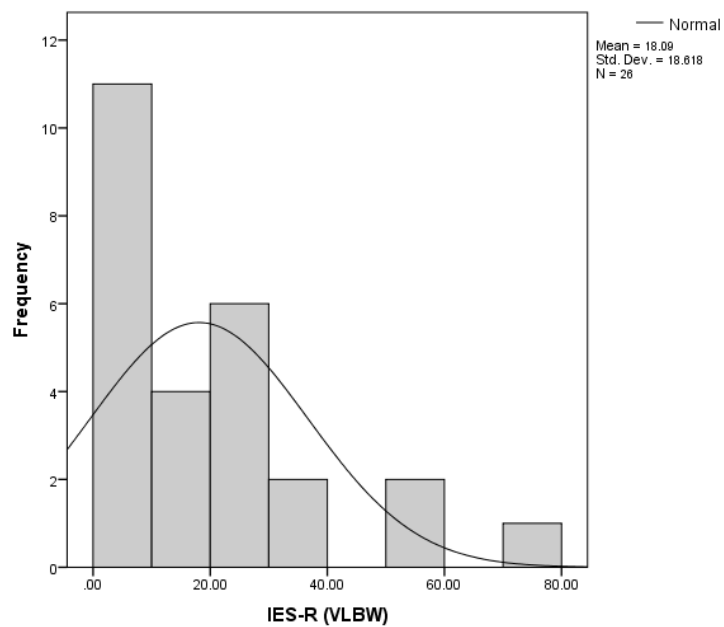


Figure U2. Term Fathers' IES-R Scores

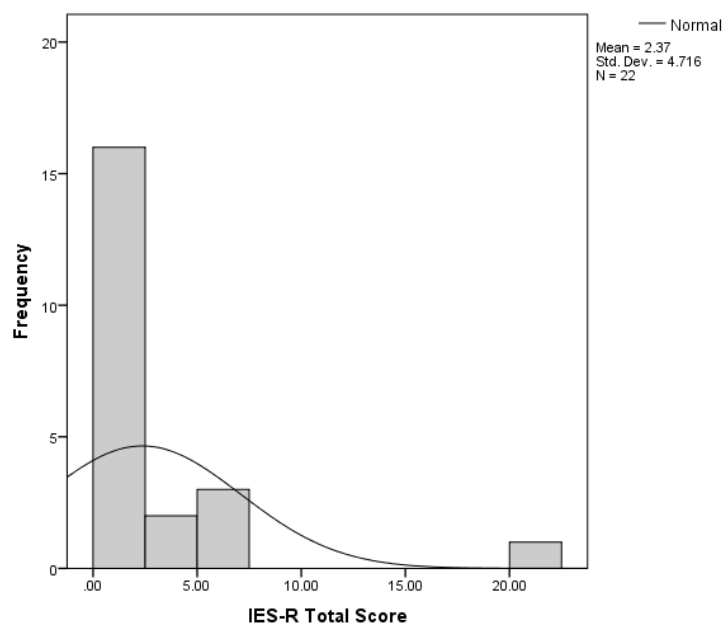


Figure U3. VLBW Fathers' ESSI Scores

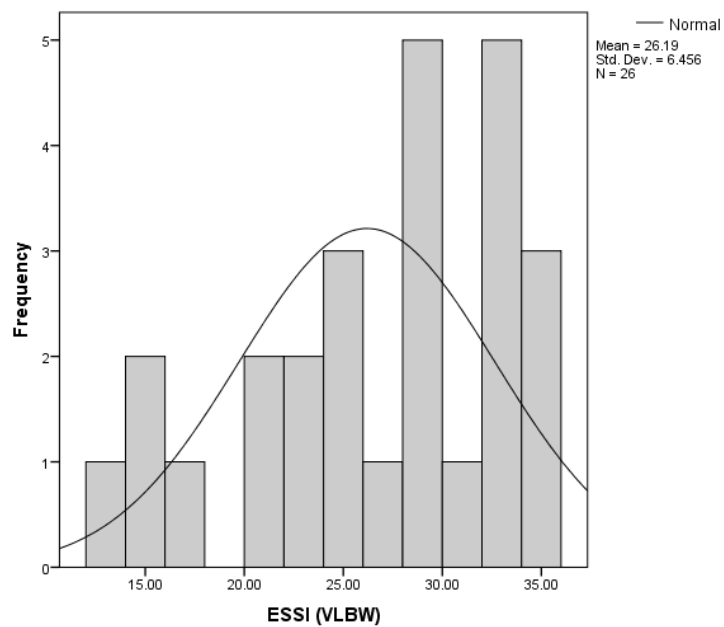


Figure U4. Term Fathers' ESSI Scores

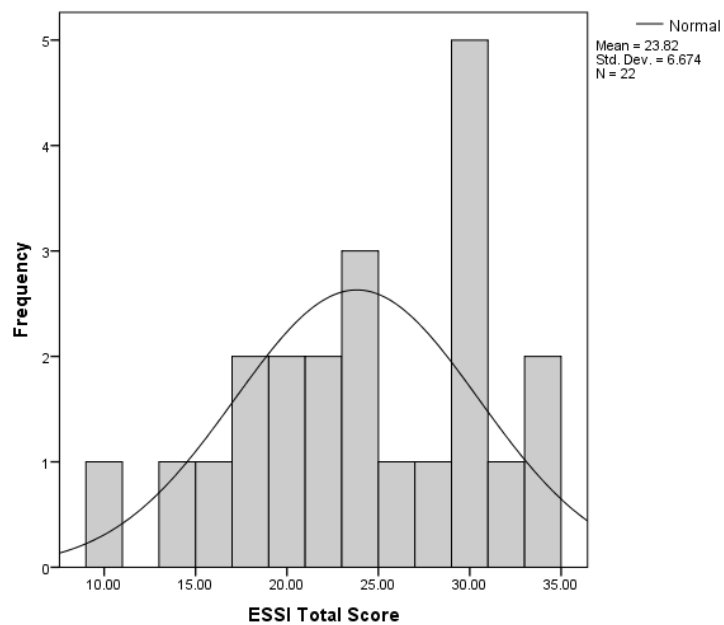


Figure U5. VLBW Fathers' GAD-7 Scores

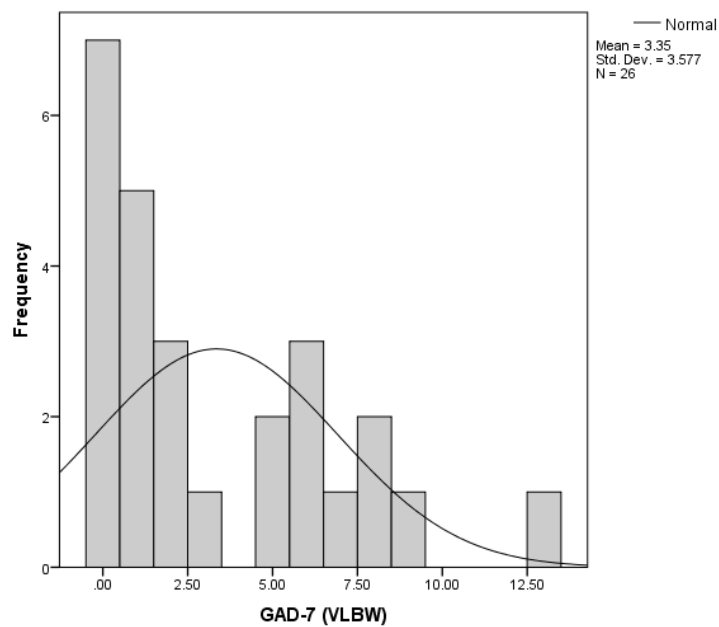


Figure U6. Term Fathers' GAD-7 Scores

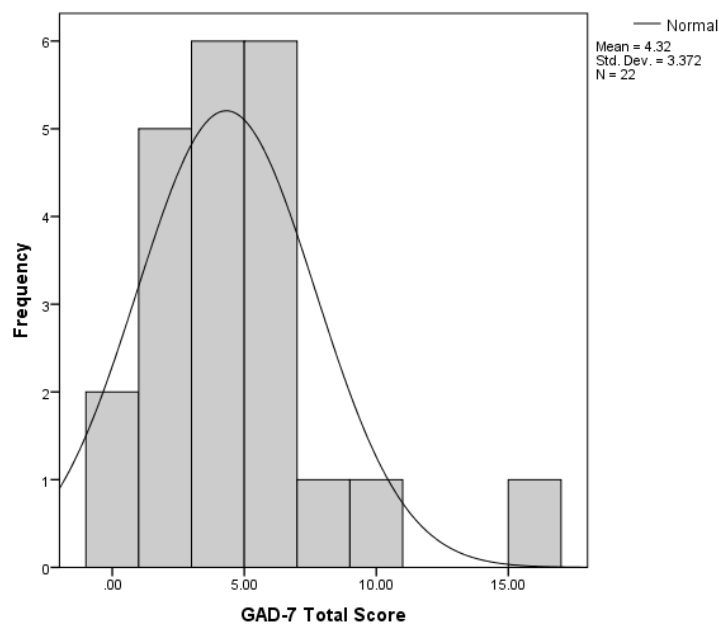


Figure U7. VLBW Fathers' PHQ-9 Scores

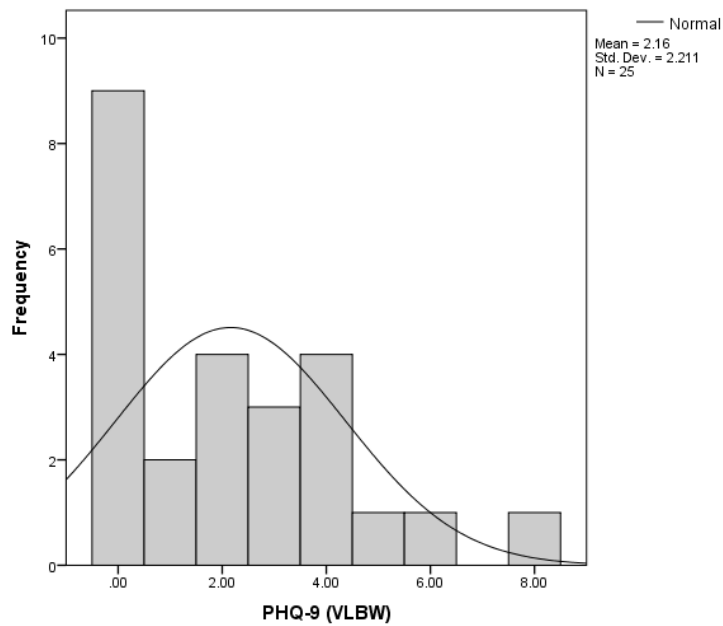
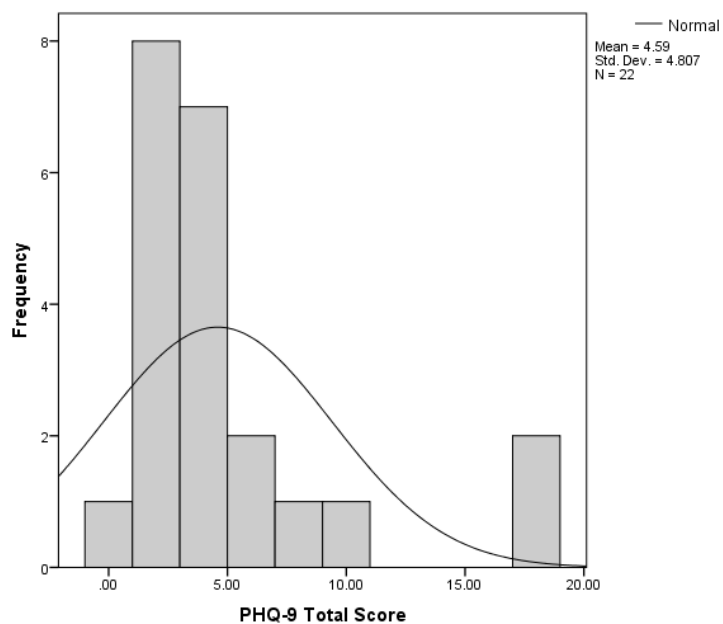


Figure U8. Term Fathers' PHQ-9 Scores



Appendix V

Scatterplots for Correlations

Figure V1. ESSI Scores and IES-R Scores for VLBW Fathers

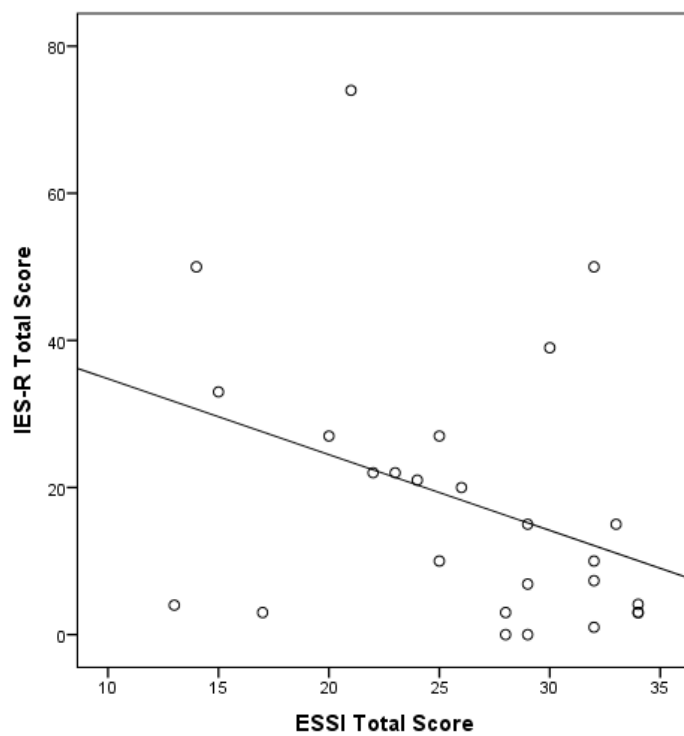


Figure V2. ESSI Scores and GAD-7 Scores for VLBW Fathers

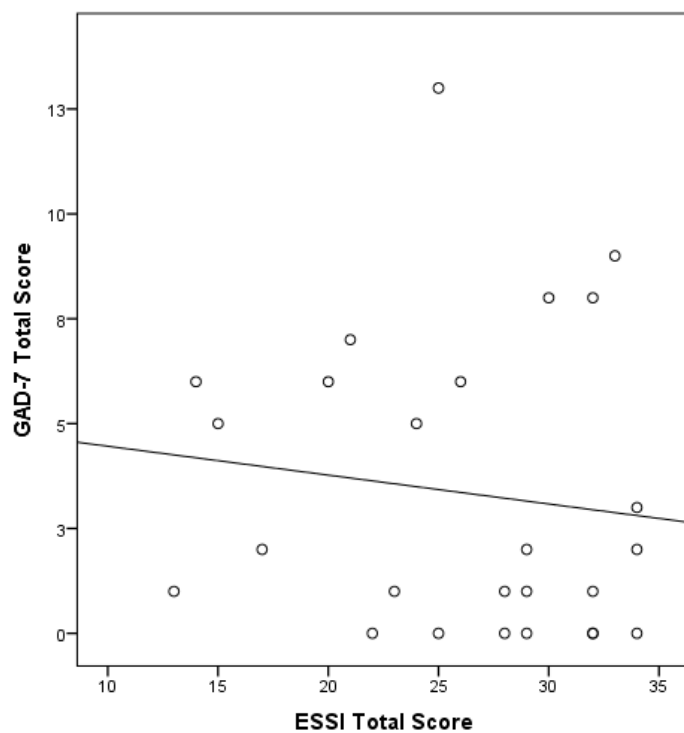


Figure V3. ESSI Scores and PHQ-9 for VLBW Fathers

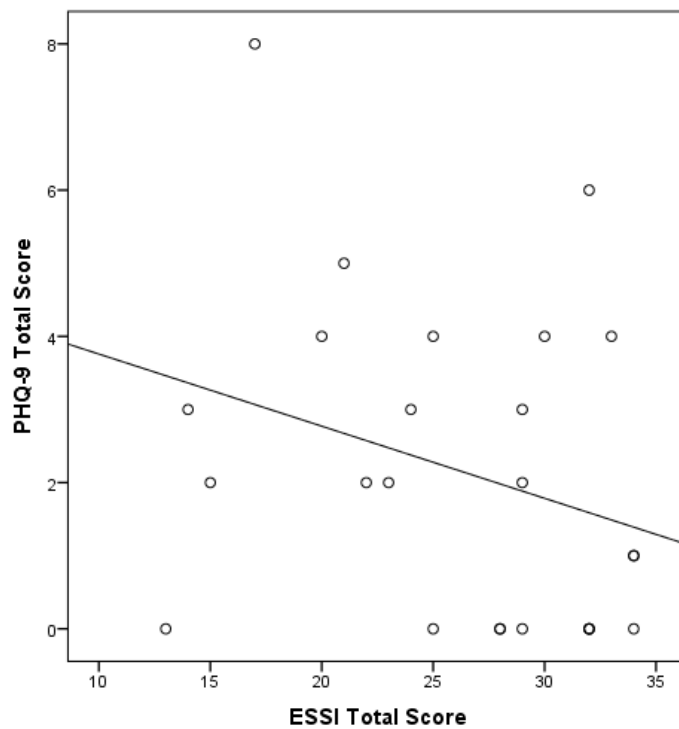


Figure V4. IES-R Scores and Infant Age for VLBW Fathers

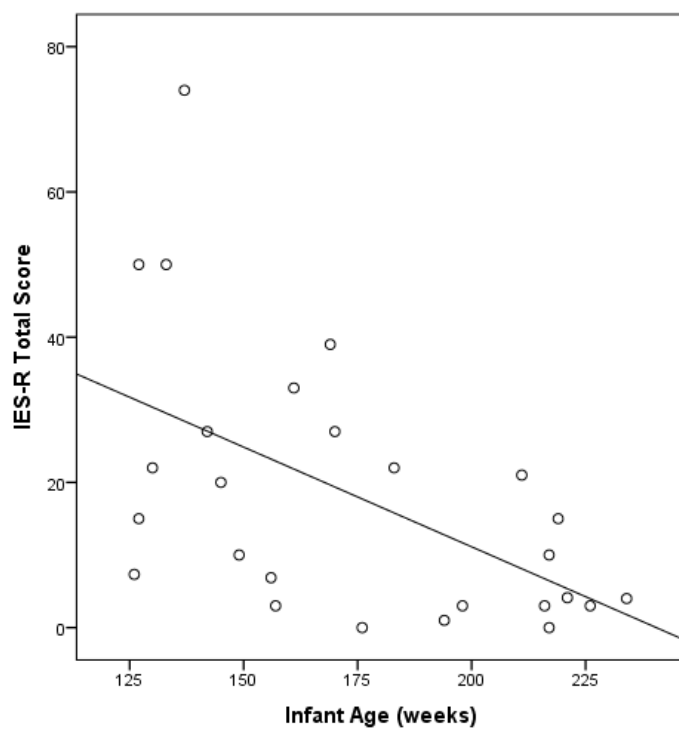


Figure V5. IES-R Scores and Infant Birth Weight for VLBW Fathers

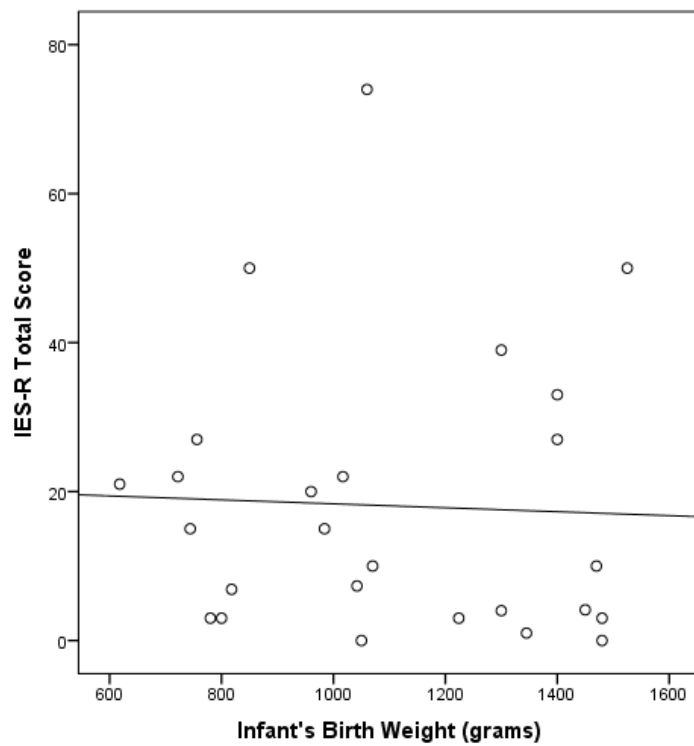


Figure V6. IES-R Scores and Infant Gestational Age for VLBW Fathers

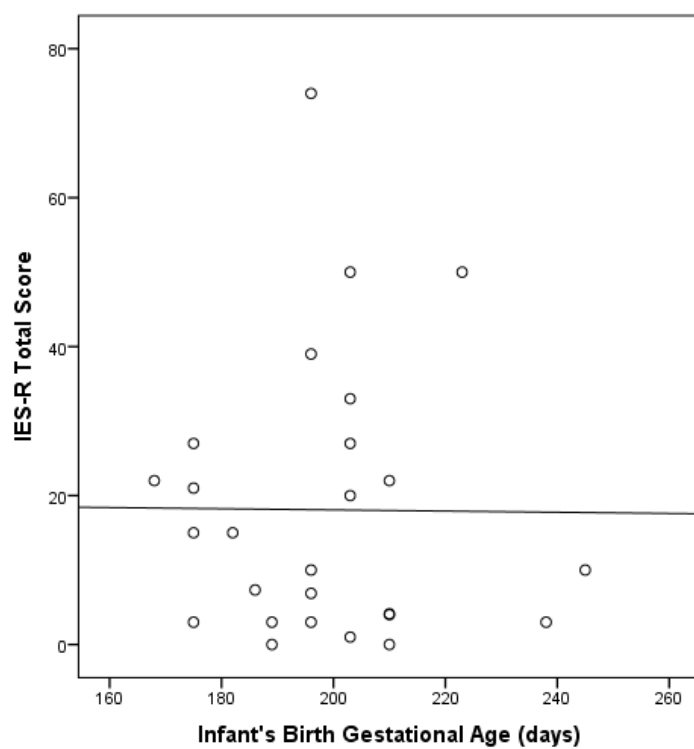


Figure V7. IES-R Scores and Infants' Length of Hospital Stay for VLBW Fathers

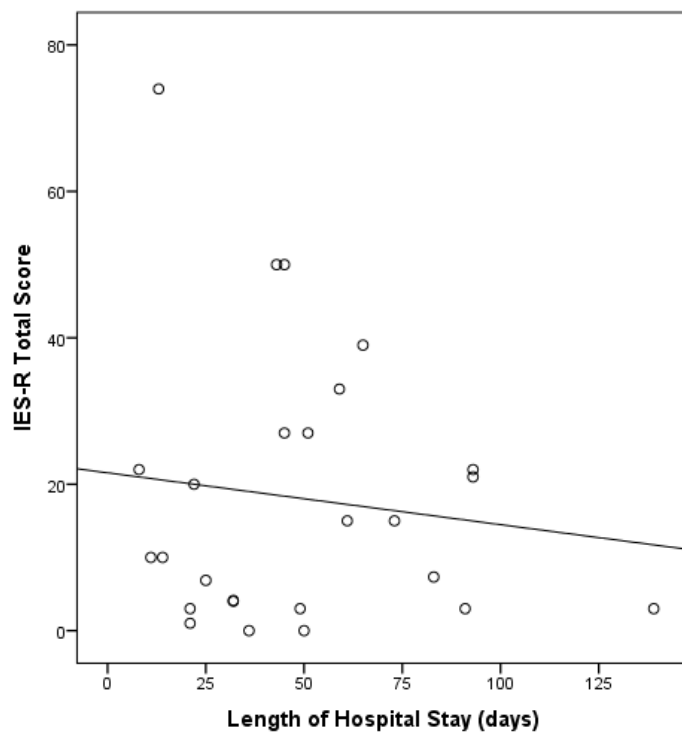


Figure V8. IES-R Scores and Infants' Length of Stay in ITU for VLBW Fathers

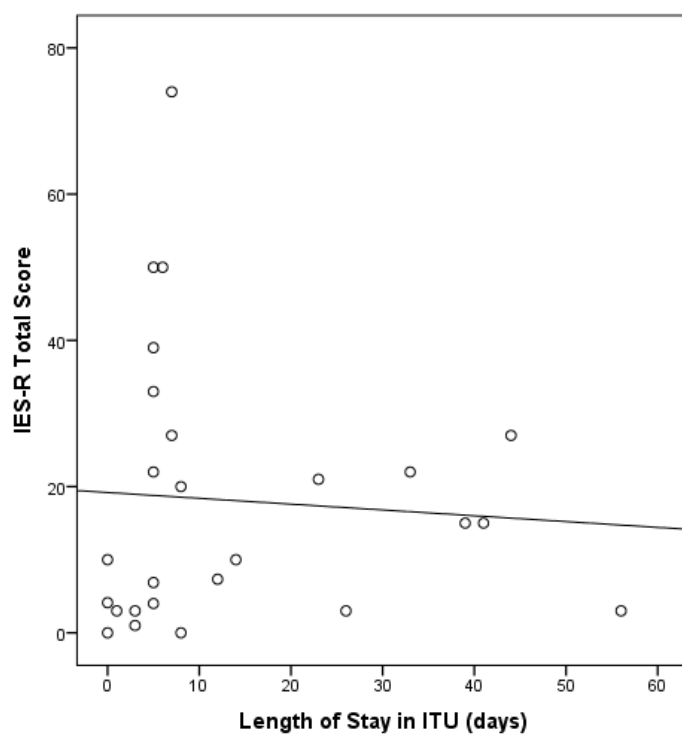


Figure V9. IES-R Scores and Infants' Length of Stay in HDU for VLBW Fathers

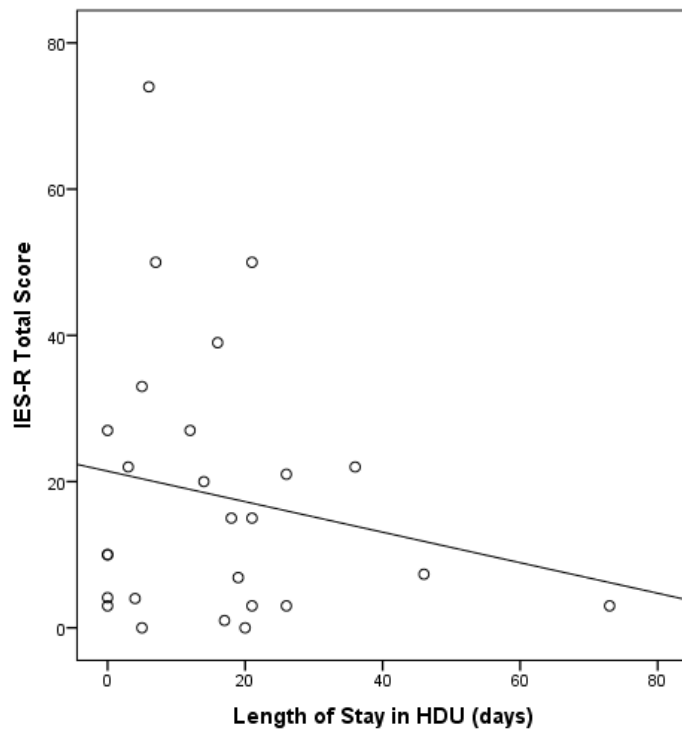
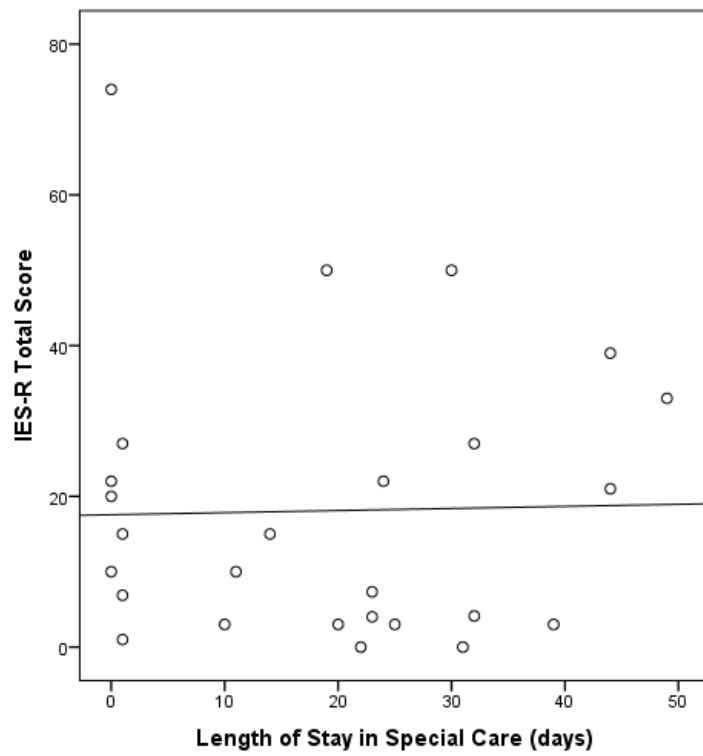


Figure V10. IES-R Scores and Infants' Length of Stay in Special Care for VLBW Fathers



Appendix W

Skewness and Kurtosis Values

Table W1. Skewness and Kurtosis Values for all Variables for VLBW Fathers

	<i>N</i>	Mean	<i>SD</i>	Skewness			Kurtosis		
				Statistic	Standard	<i>z</i> Score	Statistic	Standard	<i>z</i> Score
				Error			Error		
IES-R	26	18.09	18.62	1.44	0.46	3.15	1.99	0.89	2.24
ESSI	26	26.19	6.46	- 0.66	0.46	- 1.46	- 0.58	0.89	- 0.66
GAD-7	26	3.35	3.58	1.01	0.46	2.20	0.34	0.46	0.75
PHQ-9	25	2.16	2.21	0.89	0.46	1.91	0.37	0.90	0.41

Table W2. Skewness and Kurtosis Values for all Variables for Term Fathers

	<i>N</i>	Mean	<i>SD</i>	Skewness			Kurtosis		
				Statistic	Standard	<i>z</i> Score	Statistic	Standard	<i>z</i> Score
				Error			Error		
IES-R	22	2.37	4.72	3.26	0.49	6.65	12.15	0.95	12.78
ESSI	22	23.82	6.67	- 0.30	0.49	- 0.61	- 0.71	0.97	- 0.75
GAD-7	22	4.32	3.37	1.52	0.49	1.60	3.75	0.95	3.95
PHQ-9	22	4.59	4.81	1.96	0.49	4.00	3.45	0.95	3.63

Appendix X

Email Correspondence Regarding Data from study by Åhlund, Clarke, Hill and Thanlange
(2009)

From: CLARKE PAUL (RM1) Norfolk and Norwich University Hospital [PAUL.CLARKE@nnuh.nhs.uk]
Sent: 20 April 2016 11:38
To: Amy Alexander (MED)
Cc: Kiki Mastroyannopoulou (MED); Imogen Hobbis (MED); MASTRO KIKI (RM1) Norfolk and Norwich University Hospital
Subject: RE: Data update and mothers study queries

Hello Amy,

I have looked at the files and data and analysis and an old poster (ESPR, Prague, 2007) we had on file for Susanne's study (attached).

1. Unless Susanne has any hidden data, I suspect that there is a genuine error in reported number of term responses reported in the paper. I think it should have said $n=13$, as per data in the dataset. Looking at an old conference poster, I think she reported for some reason baseline data as $n=22$ then responses as $n=13$, which I can't quite understand. Certainly I have no data in my possession to make me think she had 22 term responses. It's possible that she got 9 blank returned forms, which she has inadvertently counted among responses (ie 22 minus 13). Without hearing from her or having access to the hard copy of returns (I have no idea what she did with them) I would not know for certain but I would presume most likely an error in paper, and that it should be $n=13$ term responses, as per raw datasheet we both have.

2. Unfortunately I have no hard copies of forms posted out or a linked database with DOBs so am unable to provide a list of DOBs for you to then work out exact ages at time of returned questionnaire. It's therefore not possible to determine mean or median age at time of responses, all we know is median gest age of included VLBW babies and date (Dec 2006) at which the questionnaires were posted out.

Sorry that is probably not very helpful, but at least it can encourage you that you probably now in reality have more term father responses than she ever had term mother responses!

Do try and cobble a poster for EAPS. It will be good for you and for all. It is only 250 words max. They will require some data analysis in Results, enough to get you accepted, but as Kiki says it does not have to be complete, and it can even be just the very headline result, with a p value for IES-R scores. Indeed there is only space for this and a one sentence conclusion in such a limited abstract.

Best wishes,
Paul

From: Amy Alexander (MED) [<mailto:Amy.L.Alexander@uea.ac.uk>]
Sent: 19 April 2016 07:46
To: CLARKE PAUL (RM1) Norfolk and Norwich University Hospital
Cc: Kiki Mastroyannopoulou (MED); Imogen Hobbis (MED); MASTRO KIKI (RM1) Norfolk and Norwich University Hospital
Subject: Re: Data update and mothers study queries

Dear Paul,

Apologies to pester but I was just wondering if you have had a chance to look at my email from last week regarding the queries about the mothers' study data as I haven't heard from Susanne. I had supervision with Kiki last Friday and we are just very mindful of time. Specifically the queries are:

* In the data files you sent there is only data for 13 term mothers, however, in the published paper it reports that there were 22 term mothers. Is there some data is missing from the files I have?

* Was data collected as to the time postpartum for the infants? The paper reports that it was 2 - 3 years but I

am wondering if there is any data on the mean/median time postpartum for both groups (this wasn't reported in the paper).

I understand it might be difficult for you to help with these questions as you possibly have nothing more than the data files you sent me, but at least I can write that in my write-up to explain why this data is not available.

I will be submitting a first draft of my results chapter to Kiki and Imogen next Tuesday (26th). A final draft of the full thesis will be submitted on the 7th June with my deadline for submission being the 28th June.

I am still waiting for a few bits of data to hopefully come in, but to be honest I think it reasonably unlikely this will now happen. I have 21 participants in the VLBW group and 18 in the term - pretty good considering and similar to the mothers' study.

In terms of a brief summary of main findings for you - there is a significant difference between the two groups on the IES-R scores (VLBW higher) and no significant differences between scores in fathers and mothers.

I also was wondering if anything more came of your enquiries regarding the paperwork Kiki and I found in one of the lecture rooms at UEA some months back?

I look forward to hearing from you.

Best wishes,
Amy

Amy Alexander
Trainee Clinical Psychologist
University of East Anglia

Email: Amy.L.Alexander@uea.ac.uk<mailto:Amy.L.Alexander@uea.ac.uk>