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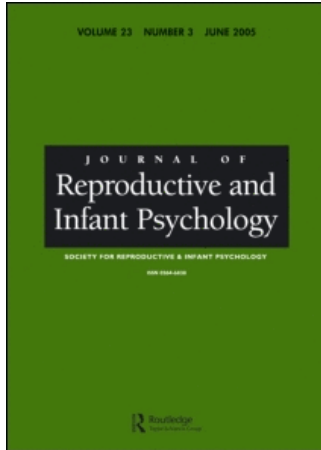Link to publication record in Queen's University Belfast Research Portal

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One goal of pregnancy is the development of maternal emotional attachment to the unborn baby, and this attachment has been shown to be related to later relationships and development. There are many factors which may hinder the development of prenatal attachment, including the presence of complications, hospitalisation, and anxiety. However, women's appraisals of risk may not be congruent with medical assessments of risk. The current study sought to model the relationships between risk (maternal perceptions and medical ratings), coping, psychological well-being, and maternal–foetal attachment among 87 women hospitalised for pregnancy-related complications. Analysis indicated that positive appraisal as a coping strategy mediates the relationship between maternal appraisals of risk and maternal–foetal attachment, and that medical ratings of risk were not predictive of maternal–foetal attachment. Awareness of the potential incongruence between patients' and health professionals' perceptions of risk is important within the clinical environment. The potential benefits of promoting positive appraisal in high-risk pregnancy merit further research.

Keywords: attachment; pregnancy; psychosocial factors

Background

Advances in prenatal medical techniques have significantly improved the potential for healthy birth outcomes for women with a medically high-risk pregnancy and their babies. However, women with complicated pregnancies who are hospitalised may experience stress associated with hospitalisation in addition to the anxiety which may be associated with their risk status. According to Stainton, McNeil and Harvey (1992), the usual processes of adaptation to pregnancy are disrupted when a woman experiences complications because she must now cope with the uncertainty of attaining motherhood. In a review of the literature pertaining to the stressors associated with high-risk pregnancy and antepartum hospitalisation, Heaman (1998) reported that separation from home and family, loss of control and boredom were frequently identified by studies as sources of stress for pregnant women admitted to hospital. Compared with low-risk pregnant women, high-risk women who were hospitalised for a pregnancy complication reported significantly higher levels of anxiety and depression (Mercer, Ferketich, May, DeJoseph, & Sollid, 1988), lower

self-esteem, less satisfaction with their body, and less positive evaluation of the pregnancy (Becker, 1984 as cited in Heaman, 1998).

In addition to these immediate manifestations of distress, Snyder (1984) has suggested that women could reject feelings of concern and affection for the foetus because of a fear that it will not survive, thereby impeding the development of maternal prenatal attachment with the developing foetus, and also influencing later maternal–child relationships, future childbearing and family interactions. However, there appears to be a lack of empirical and reliable studies that support this view (Mercer et al., 1988) as several researchers have found no significant differences in foetal attachment scores between women with high-risk and normal pregnancies (Hsu & Chen, 2001; Kemp & Page, 1987). There is also a lack of consistency in the findings of studies examining the psychosocial correlates of maternal–foetal attachment in high-risk populations, with some authors reporting no relationships between psychological variables such as anxiety and depression, and maternal–foetal attachment (Mercer et al., 1988), and others (Condon & Corkindale, 1997) finding that these variables (depression, anxiety and other Profile of Mood Scale scores) strongly impact upon the quality of attachment experience. This inconsistency is highlighted by Laxton-Kane and Slade's (2002) review of the literature, where they conclude that apart from the research pertaining to conception via in-vitro fertilisation, no conclusions about the effect of risk on prenatal attachment can be made due to the limited number of studies published. Some of this inconsistency may be explained by the different measures of attachment employed, and several studies (see Laxton-Kane & Slade, 2002, for a review) have questioned the reliability and validity of the widely used Maternal Foetal Attachment Scale (Cranley, 1981).

Another important consideration is that women with complicated pregnancies may make an appraisal of risk that is independent of, and sometimes divergent from, the risk status determined by health care professionals (Ford & Hodnett, 1990). It is therefore important to consider the woman's own perception of her pregnancy related difficulty in addition to the medical risk rating made by medical personnel (Corbin, 1987 as cited in Gupton, Heaman, & Cheung, 2001). In order to address this potentially important distinction between perceptions of risk in the prediction of maternal–foetal attachment, the current study sought to investigate the relationship between maternal perceptions of risk (in addition to medical risk ratings) and maternal–foetal attachment among women who have been hospitalised for a pregnancy related complication (rather than focusing on medically high-risk versus low-risk populations).

A further aim was to investigate whether coping strategies and social support might influence the relationship between risk and prenatal attachment. The theoretical framework which guides this research is based on the model of stress by Lazarus and Folkman (1984). According to this model, social support and coping may influence the relationship between perceived stressors and stress outcomes; for example, emotion-focused coping involves the regulation of affect surrounding a stressful encounter (such as positive reappraisal of the situation), and problem-focused coping is directed towards alleviating the circumstances that produce stress (such as planning and finding solutions). Therefore, the study seeks to assess: the extent to which medically assessed risk status, maternal risk appraisal, social support, coping, anxiety and depression predict maternal–foetal attachment among women hospitalised for pregnancy complications; and to model the relationships between these variables.

Method

Participant recruitment was conducted in an antenatal ward of a regional maternity hospital in Northern Ireland. Inclusion criteria were: maternal age of 18 years or older; minimum gestational age of 24 weeks; an ability to understand English; and diagnosis of a pregnancy-related complication requiring hospitalisation for a minimum of 48 h. Women were excluded from participation if they had a history of stillbirth or post-24 week gestational loss. Of the 142 women who were invited, 119 consented to participate.

Ethical approval for the study was granted by the NHS Central Office for Research Ethics Committees. Midwives identified women who met the inclusion criteria for the study and sought verbal permission for the researcher to make contact. Women were advised that the purpose of the study was to investigate factors that might affect the mother's attachment with her developing baby during pregnancy. Women were asked to complete the questionnaire packs in their own time during their admission. Questionnaire packs given to participants comprised the following:

Demographic and medical history questionnaire
This comprised questions regarding maternal age, number of previous pregnancies, maternal education level, living arrangements, gestational age, previous history of anxiety or depression, previous pregnancy loss, and whether the pregnancy was planned or unplanned.

Maternal Antenatal Attachment Scale (MAAS; Condon, 1993)
This is a 19-item, self-report measure of maternal–foetal attachment assessing the following two dimensions: 'Quality of attachment' (including 'experiences of closeness, tenderness … conceptualisation of the foetus as a "little person"'); and 'Intensity of attachment' (representing the amount of time spent thinking about or talking to the foetus) (Condon & Corkindale, 1997: 359). Laxton-Kane and Slade (2002) reported that the MAAS has good levels of internal consistency (Cronbach's alpha >0.8) and report studies that demonstrate support for construct validity. Higher scores indicate higher levels of maternal–foetal attachment.

State–Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1983)
This is a self-report measure consisting of two 20-item subscales: *state* which refers to how respondents are feeling 'right now'; and *trait* which refers to how they feel 'generally' (Ayers, 2001). Both subscales are scored separately on a 4-point scale. Higher scores indicate higher levels of state and trait anxiety. Ayers (2001) reported that STAI offers a reliable and widely used measure of anxiety that has been used in women prepartum and postpartum and that internal consistency ranges from 0.86 to 0.95 for the state subscale and 0.89 to 0.91 for the trait subscale.

Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983)
This is a 14-item self-report questionnaire used to identify adverse anxiety and depression states. This scale is comprised of two subscales: measuring anxiety (seven items) and depression (seven items). Higher scores indicate greater severity of the emotional state.

Prenatal Distress Questionnaire (PDQ; Yali & Lobel, 1999)
This is a 16-item self-report measure which assesses concerns related to different aspects of pregnancy: physical symptoms; parenting; relationships; bodily changes; labour and delivery; and the health of the baby. Respondents are asked to rate each pregnancy-related concern on a five-point scale. Responses are totalled to create an overall score, with higher scores indicating higher levels of distress. Yali and Lobel (1999) reported that the internal consistency of this instrument was high (Cronbach's alpha=0.81).

Prenatal Coping Inventory (PCI; Lobel, Yali, Zhu, DeVincent, & Meyer, 2002)
This is a 36-item, self-report measure which assesses the ways in which pregnant women cope with their experience and challenges of pregnancy. Respondents are required to report on a five-point scale how often they used the four coping strategies during the last month. Lobel et al. (2002) demonstrated that the 'prayer' and 'preparation' scales had high levels of test–retest reliability (coefficients ranged from 0.72 to 0.78) while 'positive appraisal' and 'avoidance' had lower but acceptable reliability (coefficents ranged from 0.66 to 0.71).

Short Form Social Support Questionnaire (SSQ6; Sarason, Sarason, Sherin, & Pierce, 1987)
This six-item, self-report measure is a shortened version of the original SSQ and yields two measures: number of supports; and satisfaction with support received. Respondents are asked to list all the individuals known to them who provide the particular type of support described in that question and are then asked to rate on a six-point scale their level of satisfaction with this type of support. Sarason et al. (1987) reported that both subscales have high internal consistency (Cronbach's alpha=0.90 and 0.93) and high test–retest reliability.

Maternal risk appraisal
In order to avoid causing undue distress to participants by asking specific questions pertaining to potential for harm to their pregnancy, the decision was taken to ascertain women's general perceptions of their own and their baby's health during pregnancy and following delivery. The following single-item measures were developed to reflect aspects of women's appraisal of risk to themselves and risk to their babies:

1. How healthy do you feel now?
2. How confident are you that you will be healthy after delivery?
3. How confident are you that your baby is healthy now?
4. How confident are you that your baby will be healthy after delivery?

Women were asked to rate on a five-point scale (0=not at all to 4=extremely) their responses to the above single-item measures. Principal components analysis (with oblimin rotation) suggested that items 1 and 2 could be combined into a scale which was labelled 'maternal appraisal of own health', and that items 3 and 4 could be combined into a scale which was labelled 'maternal appraisal of baby's health' (see Table 1 for factor loadings).

Table 1. Factor loadings for maternal risk appraisar.

	Maternal appraisal of own health	Maternal appraisal of baby's health
How healthy do you feel now?	.884	
How confident are you that you will be healthy after delivery?	.791	
How confident are you that your baby is healthy now?		.910
How confident are you that your baby will be healthy after delivery?		.917
% of variance explained	48.04	30.81

Factor loadings less than an absolute value of 0.3 have been suppressed.

Medical risk assessment

Given the lack of any standardised measure, the medical chart of each woman was reviewed by a Senior Registrar in Obstetrics with Subspeciality in Foetomaternal health to provide a pregnancy risk score for the time when the mother completed her questionnaire: 0=low; 1=intermediate; or 2=high. Factors considered included maternal medical history; previous obstetric history and current pregnancy issues – factors which are routinely considered in the diagnosis of high-risk pregnancy.

Results

Of the 119 participants, 26 returned incomplete questionnaires and 6 had delivered within 24 h, and were therefore excluded from the analyses. Hence, a total of 87 (73%) participants were included in the data analyses. Mann–Whitney U tests revealed no significant differences in maternal age ($Z=0.198$, $p=.843$), gestational age ($Z=1.235$, $p=.217$), parity ($Z=0.087$, $p=.931$) and number of previous losses ($Z=0.055$, $p=.956$) between those who were excluded from the analyses ($N=32$), and those included ($N=87$). Similarly, chi-square tests revealed no significant differences between the groups in terms of the proportions of planned and unplanned pregnancies ($\chi^2=.001$, df=1, $p=.973$).

Most of the women in the sample analysed (90.5%) were either married or living with their partner and 97.6% had completed second level education. Mean gestational age was 33.4 weeks (SD 3.79; range 24–41 weeks). Mean maternal age was 30 years (SD 5.6; range 18–42 weeks). Thirty-four percent of women were primigravidas, 35% had one or more previous pregnancy loss, and 55% had planned the index pregnancy. The mean length of admission at the time of completing the questionnaire was 3.8 days (SD 3.6; range 2–21 days). Thirty-four women (39%) had been admitted to hospital due to concerns related to delivery (e.g. premature rupture of membranes, bleeding, placenta praevia). For 6 women (7%), medical notes indicated reasons directly related to the baby (e.g. decreased foetal movement, static growth) while concerns were more related to maternal health in 38 (44%) cases, many with potential risk to the baby (e.g. raised liver enzymes, high blood pressure, urinary tract infection). Diagnosis was not available for 9 women (10%). Preliminary analyses were conducted to remove any variables demonstrating very weak relationships with the criterion variables of 'intensity of attachment' and 'quality of attachment'. Associations between the predictor variables and the two subscales

Table 2. Associations between attachment and all other variables.

	Quality of attachment	Intensity of attachment
Maternal age	.021	−.129
Number of previous pregnancies	.055	−.167
Gestational age	.017	.023
History of anxiety/depression	.281**	.210
Planned/unplanned pregnancy	−.127	−.217*
Maternal education level	.234	.210
Living arrangements	.247	.224
Previous pregnancy loss	.084	.004
HADS anxiety	−.441**	−.168
HADS depression	−.390**	−.288**
Coping – prayer	−.012	.181
Coping – preparation	.062	.434**
Coping – positive appraisal	.546**	.643**
Coping – avoidance	−.427**	−.224*
SSQ6 – number of supports	.161	.125
SSQ6 – satisfaction with support	.175	.046
STAI state anxiety	−.350**	−.197
STAI trait anxiety	−.490**	−.259
Prenatal distress	−.384	−.120
Medical risk rating	.113	.042
Maternal appraisal of own health	.305**	.297**
Maternal appraisal of baby's health	.239*	.232*

* Significant at $p<0.05$; ** significant at $p<0.01$.

of attachment were explored using Pearson's correlation coefficient for continuous variables, and eta for categorical variables (see Table 2). Only variables which showed an association at or above an absolute value of .2 with one subscale of attachment were entered into the final hierarchical regression analyses. Hence the following predictor variables were retained: maternal appraisal of own health; maternal appraisal of baby's health; history of anxiety/depression; whether the pregnancy was planned or unplanned; HADS (anxiety and depression); coping – preparation; coping – positive appraisal; coping – avoidance; state anxiety; trait anxiety; prenatal distress score; maternal education level; and living arrangements. Correlation analysis (using Spearman's rho) also demonstrated that associations between medical risk ratings and maternal appraisals of risk were weak and non-significant: $\rho=.162$, $p=.134$ (maternal appraisal of own health); and $\rho=-.070$, $p=.518$ (maternal appraisal of baby's health).

Predicting maternal–foetal attachment

All the retained predictor variables were included in two hierarchical regression analyses – one regression model for each of the subscales of quality and intensity of attachment. Dummy variables were created for categorical variables with more than two categories. In addition to the two maternal appraisal variables, background and demographic variables were entered as a first block of predictors in the regression analyses. Subsequently, measures of coping and psychological well-being were entered as a second block in order to determine their additional contribution to the variance in attachment.

Table 3. Regression analysis for quality of attachment subscale scores.

		Beta	t	p-value
Model 1	Maternal appraisal of baby's health	.210	2.021	.047
	Maternal appraisal of own health	.250	2.414	.018
	Education: secondary vs. postgraduate	−.183	−1.216	.228
	Education: further vs. postgraduate	−.032	−.234	.816
	Education: degree vs. postgraduate	−.245	−1.938	.056
	Living arrangements: partner vs. spouse	−.110	−1.060	.293
	Living arrangements: family of origin vs. spouse	−.347	−3.132	.002
	Planned/unplanned pregnancy	−.056	−.508	.613
	History of anxiety/depression	.100	.938	.351
	Adjust. R^2=.232, F(9, 76)=3.85, p<.001			
Model 2	Maternal appraisal of baby's health	.056	.478	.634
	Maternal appraisal of own health	.047	.396	.693
	Education: secondary vs. postgraduate	−.104	−.699	.487
	Education: further vs. postgraduate	−.050	−.363	.718
	Education: degree vs. postgraduate	−.169	−1.370	.175
	Living arrangements: partner vs. spouse	−.044	−.420	.676
	Living arrangements: family of origin vs. spouse	−.278	−2.544	.013
	Planned/unplanned pregnancy	.038	.325	.746
	History of anxiety/depression	.052	.486	.629
	HADS anxiety	−.072	−.456	.650
	HADS depression	.008	.059	.953
	Pregnancy distress	−.079	−.521	.604
	State anxiety	.113	.779	.439
	Trait anxiety	−.143	−.898	.372
	Coping – preparation	−.102	−.780	.438
	Coping – positive appraisal	.421	3.079	.003
	Coping – avoidance	−.030	−.192	.848
	Adjust. R^2=.354, F(17, 68)=3.741, p<.001			
	F Change (8, 68)=2.798, p=.010			

Predicting quality of attachment

Assumptions of normality and homoscedasticity were met. Two cases were identified as multivariate outliers and were removed from the analysis. The variables in block 1 accounted for 23.2% of the variance in quality of attachment scores (see Table 3). With the addition of the second block the model explained 35.4% of the variance in quality of attachment scores. By adding this second block of variables it was noted that the beta values for the two maternal appraisal variables decreased considerably from those found in block 1, and specifically the beta value for coping – positive appraisal indicated this variable to be the best predictor (of those examined) of quality of attachment. This indicates that positive appraisal coping may mediate the relationship between maternal appraisal of risk and quality of attachment. Further analysis (regressing positive appraisal on the maternal appraisal variables) confirmed this to be the case. The variable 'living arrangements' was also found to be a significant independent predictor of quality of attachment: living with a spouse was associated with higher attachment scores than living with the family of origin.

Predicting intensity of attachment

Assumptions of normality, homoscedasticity, and linearity were met. A similar pattern emerged when intensity of attachment was examined as the criterion

Table 4. Regression analysis for intensity of attachment subscale scores.

		Beta	*t*	*p*-value
Model 1	Maternal appraisal of baby's health	.186	1.761	.082
	Maternal appraisal of own health	.283	2.696	.009
	Education: secondary vs. postgraduate	−.013	−.084	.934
	Education: further vs. postgraduate	.102	.720	.474
	Education: undergraduate vs. postgraduate	.036	.276	.784
	Living arrangements: partner vs. spouse	.134	1.266	.209
	Living arrangements: family of origin vs. spouse	−.120	−1.058	.293
	Planned/unplanned pregnancy	−.246	−2.172	.033
	History of anxiety/depression	.073	.668	.506
	Adjust. R^2=.167, F(9, 76)=2.893, *p*=.005			
Model 2	Maternal appraisal of baby's health	.086	.840	1.404
	Maternal appraisal of own health	.017	.152	.880
	Education: secondary vs. postgraduate	.097	.712	.479
	Education: further vs. postgraduate	.156	1.238	.220
	Education: degree vs. postgraduate	.133	1.169	.246
	Living arrangements: partner vs. spouse	.157	1.681	.097
	Living arrangements: family of origin vs. spouse	−.118	−1.183	.241
	Planned/unplanned pregnancy	−.096	−.916	.363
	History of anxiety/depression	.109	1.108	.272
	HADS anxiety	.316	2.134	.036
	HADS depression	.008	.063	.950
	Pregnancy distress	.063	.470	.640
	State anxiety	−.099	−.732	.467
	Trait anxiety	−.049	−.329	.743
	Coping – preparation	.116	1.009	.317
	Coping – positive appraisal	.613	4.822	.000
	Coping – avoidance	−.035	−.249	.804
	Adjust. R^2=.424, F(17,68)=4.688, *p*<.001			
	F change (8, 68)=5.250, *p*<.001			

variable. Block 1 (see Table 4) accounted for 16.7% of the variance in intensity of attachment scores. The addition of further variables in block 2 increased the proportion of variance accounted for to 42.4%, but again reduced the beta values of the two maternal appraisal variables from those found in block 1 alone. The best predictors (of those examined) of intensity of attachment were positive appraisal and HADS anxiety score, and further analysis again suggested that these variables both mediated the relationship between the maternal appraisal of risk variables and intensity of attachment, and between whether or not the pregnancy was planned and intensity of attachment.

Discussion

The pattern of results suggests that positive appraisal coping has a strong positive relationship with both intensity of attachment and quality of attachment. In addition, while 'maternal appraisal of own health' and 'maternal appraisal of baby's health' are consistent predictors of both quality and intensity of attachment scores, these relationships are mediated by positive appraisal coping. Positive appraisal is consistent with emotion-focused problem solving strategies proposed by Lazarus and Folkman (1984). The appraisal of threat made by the women in this study appears to be important in the development of the prenatal attachment relationship,

as the woman's appraisal of the threat of a complicated pregnancy influences the coping strategy utilised, and when a positive appraisal coping strategy is implemented, higher levels of maternal–foetal attachment are predicted. The beneficial aspects of positive appraisal in influencing maternal–foetal attachment scores are consistent with those reported by Yali and Lobel (1999), who demonstrated that positive appraisal was associated with less pregnancy-specific distress among women with a medically high-risk pregnancy. Indeed, these researchers proposed that positive appraisal 'may serve to increase commitment to motherhood' (Yali & Lobel, 1999: 47), an imperative prerequisite for the development of maternal–foetal attachment. The challenge of developing interventions to promote positive appraisal coping strategies for women with complicated pregnancies lies in the sensitive balance between the realistic medical risk in the pregnancy and challenging negative hopeless appraisals that might inhibit attachment behaviours to the unborn baby. While the withholding of emotional commitment to the foetus may be a protective mechanism where the future of the infant is uncertain (Mercer et al., 1988), the current results suggest that medically assessed risk scores are unrelated to maternal appraisals of risk and unrelated to attachment scores. Hence, a woman who is perceived by her health professional to be at relatively low risk may still appraise herself and her baby to be at higher risk with potential negative influence on the development of attachment. This interpretation may account for the failure to find any significant differences in foetal attachment scores between women with high-risk and normal pregnancies (e.g. Kemp & Page, 1987; Hsu & Chen, 2001), as it is the mother's appraisal of risk and subsequent psychological processing (and not medically assessed risk) which is important in the pathway to maternal–foetal attachment. Health professionals should be aware of the potential discrepancies between their own opinions and their patient's appraisal of risk, and the need to create an environment in which women feel free to discuss their fears. Health professionals may help to foster positive appraisal by encouraging women to focus on the positive aspects of their pregnancy, such as reaching short-term milestones or praising attempts to cope with difficult circumstances. Psychologists might also help to promote positive appraisal coping, and to modify inappropriate or negative cognitions among hospitalised women, especially where these might lead to maternal distress or attachment problems. As positive appraisal also mediates the relationship between whether a pregnancy is planned or unplanned and intensity of attachment, it may be important to recognise that women with unplanned pregnancies may be particularly vulnerable to attachment problems and that the promotion of positive appraisal strategies may be beneficial for them.

Anxiety was found to be associated with intensity of attachment. Like positive appraisal, anxiety was found to mediate the relationship between maternal appraisal of risk and intensity of attachment, and between whether the pregnancy was planned or unplanned and intensity of attachment. Relationships between women's psychological profile (anxiety or depression) and maternal foetal attachment have been reported in previous research (e.g. Condon & Corkindale, 1997). The importance of maternal appraisals, and their association with anxiety is also evidenced by research involving women who are pregnant after a previous perinatal loss – it appears that their appraisal of threat (to the current pregnancy) predicts pregnancy anxiety (Côté-Arsenault, 2007), and levels of anxiety among this

population of women are negatively related to prenatal attachment (Armstrong, 2004; Armstrong & Hutti, 1998). While it is perhaps unsurprising that women who appraise greater risk are more anxious and score more poorly on measures of attachment, it is again important within the clinical environment to be aware of maternal appraisals of risk (and their potential incongruence with medical opinion), and subsequent anxiety levels.

While positive appraisal and anxiety are certainly implicated as important predictors of maternal foetal attachment, the majority of variance in the measures of attachment is not accounted for. Social support was investigated but was eliminated from the analysis at an early stage, as it was not related to either subscale of attachment. Existing literature pertaining to social support is contradictory: Mercer et al. (1988) found no relationship between received social support and attachment for high-risk pregnant women and their partners; while Condon and Corkindale (1997) concluded that a lack of social support was detrimental to the development of maternal antenatal attachment in normal pregnancies. The current results do little to clarify the situation, possibly due (at least in part) to the low variability in satisfaction with social support (mean=5.49, SD=1.09) in this study. While the recruitment rate to the study was quite high (83%), many respondents subsequently returned incomplete questionnaires, and hence only 61% of the mothers approached were included in the final analysis. While these samples were similar on the demographic variables investigated, important differences may exist on other variables (such as social support and personality variables), and between the study participants and those who declined participation.

In addition, other variables that might have accounted for greater individual and collective variance but were not investigated include: maternal awareness of potential for pregnancy complication because of a pre-existing medical condition; and differing reasons for admission (e.g. experiencing obvious symptoms of threatened premature delivery versus prolonged precautionary admission with no obvious symptoms or discomfort). Further research investigating the predictors of maternal–foetal attachment within this population might also benefit from the inclusion of dispositional type variables, which may be associated with a woman's capacity to form different types of attachment.

Further investigation of the concept of risk in this population is warranted. Several studies have reported a distinction between women's perceptions of risk to the baby, and risk to themselves or the pregnancy (Gray, 2006; Gupton et al., 2001; Maloni & Kutil, 2000) – illustrating the complexity of the concept. While the current study also distinguished between perceived risk to mother and perceived risk to baby, these were assessed using only four single-item measures. Devising measures of subjective pregnancy risk is an important but difficult task. Yet it is essential to develop valid and reliable tools, which are sensitive to change. Other researchers have utilised visual analogue scales (Gray, 2006; Gupton et al., 2001) and acknowledged the need for refinement and psychometric testing of these scales. Exploration of the factors contributing to perceptions of risk, the processes by which women construct these meanings, and the potential for differing internal working models of attachment among women would benefit from detailed qualitative investigation.

In conclusion, the current study highlights the need to acknowledge (especially within the clinical environment) maternal perceptions of pregnancy risk, as these may differ substantially from medically assessed risk, and are more important in the

prediction of maternal–foetal attachment. In addition, the use of positive appraisal as a coping strategy mediates the relationship between perceived risk and attachment, and may potentially be a useful skill to encourage among this population of mothers. The findings from this study suggest that future research pertaining to coping with a complicated pregnancy and prenatal attachment might be suitably grounded in the stress appraisal framework of Lazarus and Folkman (1984). However, until further prospective longitudinal research can be undertaken, the direction of these relationships remains unclear. Maternal perception of risk is likely to be a complex construct and requires further detailed investigation.

References

Armstrong, D.S. (2004). Impact of prior perinatal loss on subsequent pregnancies. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *33*, 765–773.

Armstrong, D., & Hutti, M.A. (1998). Pregnancy after perinatal loss: The relationship between anxiety and prenatal attachment. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *27*, 183–189.

Ayers, S. (2001). Assessing psychopathology in pregnancy and postpartum. *Journal of Psychosomatic Obstetrics and Gynecology*, *22*(2), 91–102.

Condon, J. (1993). The assessment of antenatal emotional attachment: Development of a questionnaire instrument. *British Journal of Psychology*, *66*, 167–183.

Condon, J.T., & Corkindale, C. (1997). The correlates of antenatal attachment in pregnant women. *British Journal of Medical Psychology*, *70*, 359–372.

Côté-Arsenault, D. (2007). Threat appraisal, coping, and emotions across pregnancy subsequent to perinatal loss. *Nursing Research*, *56*, 108–116.

Cranley, M.S. (1981). Development of a tool for the measurement of maternal attachment during pregnancy. *Nursing Research*, *30*(5), 281–284.

Ford, M., & Hodnett, E. (1990). Predictors of adaptation in women hospitalized during pregnancy. *Canadian Journal of Nursing Research*, *22*, 37–50.

Gray, B.A. (2006). Hospitalization history and differences in self-rated pregnancy risk. *Western Journal of Nursing Research*, *28*, 216–229.

Gupton, A., Heaman, M., & Cheung, L.W-K. (2001). Complicated and uncomplicated pregnancies: Women's perception of risk. *Journal of Gynecology and Neonatal Nursing*, *30*, 192–201.

Heaman, M. (1998). Psychosocial impact of high-risk pregnancy: Hospital care and home care. *Clinical Obstetrics and Gynecology*, *41*, 626–639.

Hsu, T., & Chen, C. (2001). Stress and maternal–fetal attachment of pregnant women during their third trimester. *Kaohsiung Journal of Medical Science*, *17*, 36–45.

Kemp, V.H., & Page, C.K. (1987). Maternal prenatal attachment in normal and high-risk pregnancies. *Journal of Obstetric, Gynecologic and Neonatal Nursing*, *16*, 179–184.

Laxton-Kane, M., & Slade, P. (2002). The role of maternal prenatal attachment in a woman's experience of pregnancy and implications for the process of care. *Journal of Reproductive and Infant Psychology*, *20*, 253–266.

Lazarus, R.S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York: Springer.

Lobel, M., Yali, A.M., Zhu, W., DeVincent, C.J., & Meyer, B.A. (2002). Beneficial associations between optimistic disposition and emotional distress in high-risk pregnancy. *Psychology and Health*, *17*(1), 77–95.

Maloni, J.A., & Kutil, R.M. (2000). Antepartum support group for women hospitalized on bed rest. *Maternal Child Nursing Journal*, *25*, 204–210.

Mercer, R., Ferketich, S., May, K., DeJoseph, J., & Sollid, D. (1988). Further exploration of maternal and paternal attachment. *Research in Nursing and Health*, *11*, 83–95.

Sarason, I.G., Sarason, B.R., Shearin, E.N., & Pierce, G.R. (1987). A brief measure of social support – practical and theoretical implications. *Journal of Social and Personal Relationships*, *4*(4), 497–510.

Snyder, D. (1984). Effects of long-term hospitalization on the antepartal patient. *NAACOG Update Series* (Volume 1, Lesson 19). Princeton, NJ: Continuing Professional Education Centre.

Spielberger, C.D., Gorsuch, I., & Lushene, R.E. (1983). *Manual for the State–Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologist Press.

Stainton, M.C., McNeil, D., & Harvey, S. (1992). Maternal tasks of uncertain motherhood. *Maternal–Child Nursing Journal*, *20*, 113–123.

Yali, A.M., & Lobel, M. (1999). Coping and distress in pregnancy: An investigation of medically high-risk women. *Journal of Psychosomatic Obstetric and Gynecology*, *20*, 39–52.

Zigmond, A.S., & Snaith, R.P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavia*, *67*, 361–370.