School of Psychology

Ysgol Seicoleg

The association between pregnancy complication and maternal-fetal attachment in the perinatal period: A Systematic Review

Reviewing the impact of Hyperemesis Gravidarum on mother-child attachment and parenting stress up to two years' post-partum: a cross-sectional study

Thesis submitted in partial fulfilment of the requirement for the degree of:

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Declaration

STATEMENT 1

This thesis is being submitted in partial fulfilment of the requirements for the degree Doctorate in Clinical Psychology (DClinPsy)

Signed _____ (candidate). Date: 20th May 2019

STATEMENT 2

This work has not been submitted in substance for any other degree or award at this or any other university or place of learning, nor is it being submitted concurrently for any other degree or award (outside of any formal collaboration agreement between the University and a partner organisation)

Signed _____ (candidate). Date: 20th May 2019

STATEMENT 3

I hereby give consent for my thesis, if accepted, to be available in the University's Open Access repository (or, where approved, to be available in the University's library and for inter-library loan), and for the title and summary to be made available to outside organisations, subject to the expiry of a University-approved bar on access if applicable.

Signed _____ (candidate. Date: 20th May 2019

DECLARATION

This thesis is the result of my own independent work, except where otherwise stated, and the views expressed are my own. Other sources are acknowledged by explicit references. The thesis has not been edited by a third party beyond what is permitted by Cardiff University's Use of Third-Party Editors by Research Degree Students Procedure.

Signed _____ (candidate). Date: 20th May 2019

WORD COUNT: 14,653.

(Excluding summary, acknowledgements, declarations, contents pages, appendices, tables, diagrams and figures, references, bibliography, footnotes and endnotes).

Thesis Summary

Maternal-fetal attachment, the bond that forms between the mother and her foetus, has been found to be critical in the development of postnatal mother-child attachment (Rossen et al., 2016). It has also been identified as an integral component for optimum cognitive, behavioural and emotional development in children (Branjerdporn et al., 2017). However, the presence of women with complications of pregnancy have been under-represented in this evidence base. Given the impact of pregnancy complication on maternal wellbeing amongst other factors, and the critical importance of attachment, understanding the influence of these relationships is integral to developing prudent effective interventions.

In the systematic review, the evidence for the possible relationship between pregnancy complication and maternal fetal attachment was synthesised and evaluated. The review suggested that owning to a paucity of studies, with low methodological rigour, results which are equivocal, need to be interpreted with some caution. Whilst some evidence for differences in maternal fetal attachment was observed for women with pregnancy complication, it is likely that others factors including special support, anxiety and depression are influential. The review also highlights the needs for further investigation into paternal mental health and paternal fetal attachment and how these factors impact on maternal fetal attachment and capacity for social support.

The empirical paper examined maternal attachment, parenting stress, anxiety, depression, self-efficacy and social support in eighty-three women with experiences of Hyperemesis Gravidarum (HG) in pregnancy. The findings found women with HG to have higher scores on maternal attachment than age matched clinical and non-clinical samples. This is an important finding as in the absence of a unified aetiology, women with HG have been postulated to somatise symptoms of sickness as a rejection of the foetus or womanhood (Munch, 2002).

Higher levels of parenting stress were found in the HG sample when compared to age matched samples with pre-term infant's. Findings suggest that while women with HG are highly attached to their infants, the experience of HG and its psychosocial sequelae may render women so ill they are unable to prepare for the role of parenthood.

The final paper is a critical reflection on the research conducted. This paper includes a discussion of the rational, strengths and weakness of the systematic review and empirical paper as well as a critique of the broad methodological approach used. Clinical and theoretical implications, directions for future research and dissemination are also discussed.

Pregnancy Complication and Maternal-Fetal Attachment in the Perinatal Period: A Systematic Review

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Paper one has been prepared for submission to the British Journal of Health Psychology (see appendix A for submission details).

For ease of reading, figures and tables have been included in the text rather than at the end of the document.

Word count (excluding tables, figures and references): 5,156.

ABSTRACT

Purpose Pregnancy complication is reported to impact up to 20% of pregnancies and is a leading cause of neonatal death. Pregnancy complications are reported to increase maternal stress and decrease mental wellbeing. Less is known about the effect of pregnancy complication on maternal-fetal attachment. The purpose of this review was to systematically evaluate the evidence regarding maternal fetal attachment in women with pregnancy complication.

Methods: A systematic review of four databases (PsycINFO, Medline, Web of Science, CINAHL) was conducted following the PRISMA guidelines for reporting systematic reviews. Searches were performed for articles of all study designs through March 2019. The NIH quality appraisal tool for Observational, Cohort and Cross-sectional designs was used to assess bias across studies.

Results: This review found 11 papers in total which met the search criteria. Results highlight a lack of research which is equivocal in nature. The research is limited by low methodological quality, summarised by a lack of unitary definition, mixed samples of medically at risk women (e.g. gestational diabetes, women with Hyperemesis Gravidarum, women at risk for pre-term delivery), and a lack of follow up.

Conclusion: There was mixed evidence suggesting that pregnancy complication negatively impacts maternal fetal attachment. Expanding on the research base and improving the methodological rigour of studies will enable a better understanding of the effects of pregnancy complication on the development of attachment in the perinatal period.

Keywords: *pregnancy induced illness, pregnancy complication, maternal-fetal attachment, mother-child bonding, prenatal, postnatal, pregnancy.*

Pregnancy complication and maternal-fetal attachment in the perinatal period: A Systematic Review

1. INTRODUCTION

Maternal fetal attachment

Pregnancy is purported to represent a period of change and transition for the mother. This period signifies the beginning of the attachment period, as the mother to be accomplishes a series of developmental stages (Solomon & George, 1996). This process of adaptation, better known as maternal-fetal attachment (MFA), was first conceptualised by Bowlby (1969) and is well represented in the literature (Alhusen. 2008; Canella, 2005; Luisa, Callinan & Smith, 2019). Bowlby (1969) suggests that one of the main ways of understanding attachment is in terms of the feelings and behaviours which relate to the prospective mother's own cognitive representations of herself as a care-giver. These may include imagined scenarios between mother and child (Salisbury et al., 2003), and attributing hopes and dreams for the person they are going to be once born. MFA is also developed through maternal behaviours that demonstrate care and nurturance. These include optimum health behaviours (eating well, attending antenatal appointments) and physical preparation for the infant's arrival (buying baby clothes, safe proofing the home) (Salisbury et al., 2003). The development of MFA has been found to be critical in postnatal attachment (Rossen et al., 2016; Siddiqui & Hägglöf, 2000). It has also been identified as an integral

component in optimum development of cognitive, behavioural and emotional factors for the infant (Branjerdporn et al., 2017).

Systematic evidence presents an account of many different variables which are influential to MFA. Publications by Gaffney (1988), Muller (1992), Erikson (1996) and Yarcheski et al. (2009) find evidence for obstetric factors including: maternal age, gestational age, parity, prenatal testing and pregnancy intention; demographic and socioeconomic factors including ethnicity, marital status, income and education; and psychosocial factors including maternal mental health, social support, self-esteem, and attachment relationship with one's own mother. The meta-analytic review by Yarcheski et al. (2009) examined the magnitude of the relationships between predictors and MFA, and found gestational age and social support to be most influential. A small effect was found for anxiety and depression, with trivial effects for demographic and obstetric factors. A common theme reported between reviews include the methodological weaknesses of studies, which were limited to small, homogenous samples. Therefore, results should be interpreted with caution. Furthermore, the underrepresentation of women with pregnancy complications included in the evidence base necessitates further investigation.

Pregnancy complication

Pregnancy complication is reported to impact up to 20% of pregnancies and is a leading cause of neonatal death (World Health Organisation, 2018). Women who experience pregnancy complication are reported to experience increased stress levels, and poorer mental wellbeing, the effects of which often lasting long after the pregnancy culminates (Poursharif et al., 2008). However, little is known about the impact of pregnancy complication on the attachment process. Research published in

the late 1970 and 1980's report conflicting results (Avant, 1981; Boudreaux, 1981; Curry & Snell, 1985; Penticuff, 1982). The broad nature of pregnancy complication, alongside a varied battery of psychological constructs used to measure maternal—fetal attachment may have contributed to conflicting results and ambiguity.

Aims

The importance of MFA is clear, but there is a paucity of research examining this construct in women with pregnancy complication. It is essential that healthcare providers are aware of any potential implications to MFA in women with pregnancy complications so they can provide timely support in a prudent and effective manner. Therefore, the following aims were identified:

1. To identify how the experience of pregnancy complication may impact MFA in the perinatal period.
2. To explore whether type of pregnancy complication experienced (gestational diabetes, hyperemesis gravidarum or more broadly grouped pregnancy complication) differs in its potential impact on MFA in the perinatal period.
3. To explore whether gestational timing of pregnancy complication experienced differs in impact on MFA in the perinatal period.
4. To identify whether the experience of hospitalisation for a pregnancy complication impacts development of MFA in the perinatal period.

2. METHODS

Protocol and Registration

The PRISMA guidelines (Moher, Liberati, Tetzlaff & Altman, 2009) were followed for conducting this systematic review. Key aspects of this review are recorded in the international database of prospectively registered systematic reviews PROSPERO by the Centre for Reviews and Dissemination, New York (CRD42019130377), which can be accessed at: https://www.crd.york.ac.uk/prospero/.

Eligibility criteria

As this literature is exploratory and in its infancy, all study designs were included for review. The population focussed on women with pregnancy complication. This included: hypertensive disorders of pregnancy (high blood pressure, preeclampsia, gestational hypertension, HELLP syndrome, acute fatty liver of pregnancy), hyperemesis gravidarum, nausea and vomiting (NVP), gestational diabetes mellitus, pregnancy related anaemia, pelvic girdle pain, pre-term labour, placenta previa, premature rupture of membrane (PROM), placental abruption, intrauterine bleeding, pre-term labour. Criteria for defining pregnancy complication was generated from the International Statistics Classification of Diseases and Related Health Problems (ICD-10, 2016), guidelines from the Centre for Disease, Control and Prevention (CDC; accessed at https://www.cdc.gov/reproductivehealth/pregnancy-complications.html) and a review of the literature base. Specific study characteristics are displayed in PICOS format in Appendix B.

Information sources & search strategy

Four online databases Medline/PubMed, Web of Science, PsycINFO and CINAHL were systematically searched. The last date for completing searches was March 27th 2019. Search terms were devised by the author and research team. Search terms were then sense checked by a university librarian to ensure sensitivity and specificity was achieved. Search results included articles from database inception up to the day of the performed search. Additional papers were identified by targeted reference search. If a full text could not be accessed, then the author was contacted and asked to provide a copy. Finally, corresponding authors of included papers were contacted for information regarding studies in progress and unpublished research. Search terms can be viewed in Appendix C.

Study Selection

Due to the dearth of empirical evidence dedicated to pregnancy induced illness and prenatal attachment, broad search terms were used to achieve specificity. Eligibility criteria was confined to original articles published in peer reviewed journals, in English or with an English abstract. Grey literature (Doctorate, Masters and Bachelors dissertations, book chapters and other unpublished sources) was excluded. All results compiled from database searching were combined and screened for duplicates. Titles and abstracts were screened for relevancy and excluded if they did not meet the inclusion/exclusion criteria. If eligibility could not be determined from the screening of title and abstract, the full text article was retrieved and reviewed.

Data collection process

A data extraction form was developed for the purposes of this review. The form was based upon criteria outlined in a review by Mueller et al. (2018) and information deemed essential to the reviews objectives (e.g. type of attachment construct used). Advice was sought from an author, Dr Ariane Göbel, who has recently published a systemic review on a similar topic (Göbel et al., 2018). The data extraction form was pilot tested by the author on three articles, with additional criteria added where necessary (e.g. attrition rate and how it was dealt with; cultural factors). The final form can be viewed in Appendix D. Where more information was required regarding study criteria, individual authors were contacted by email and asked to supply information on missing details.

Risk of bias

This review reports on observational studies. Owing to their design, observational studies will generally have more numerous and more serious sources of bias than other study designs such as randomised control trials (RCT). To remediate against the impact of bias, a valid and reliable component tool was selected for the quality appraisal of observational, cohort and cross-sectional studies (National Institute of Health, National Heart, Lung and Blood (NIH NHLBI) Quality Assessment Tool for Observational, Cohort and Cross-Sectional Studies; see Appendix E). The NIH is a 14-item tool that appraises studies across 5 domains of bias: selection bias, information bias, performance bias, attrition bias, measurement/detection bias, or confounding, and reporting bias. The NIH tool does not give an overall appraisal of quality; rather overall judgement is determined by the rater upon completion of use. As this research area is still emerging, all studies regardless of quality appraisal will be reported on in the final synthesis.

3. RESULTS

Study selection

A total of 486 articles were identified following database searches and reference list reviews (Figure 1). Evaluation of the title and abstracts per the exclusion criteria decreased the articles to 20 for full text review. Following full text review, 9 articles were excluded as they did not meet the study inclusion criteria. Most articles focussed on high risk pregnancy and maternal mental health, but did not focus on maternal fetal attachment. Three articles were removed as the authors did not give a definition of 'high risk pregnancy'. One article was in Portuguese and once translated was found to not suit the study inclusion criteria fully. A final sample of 11 studies remained, which were published between 1986 and 2015. Study selection is shown in PRISMA format in Figure 1.

Figure 1: PRISMA flow diagram

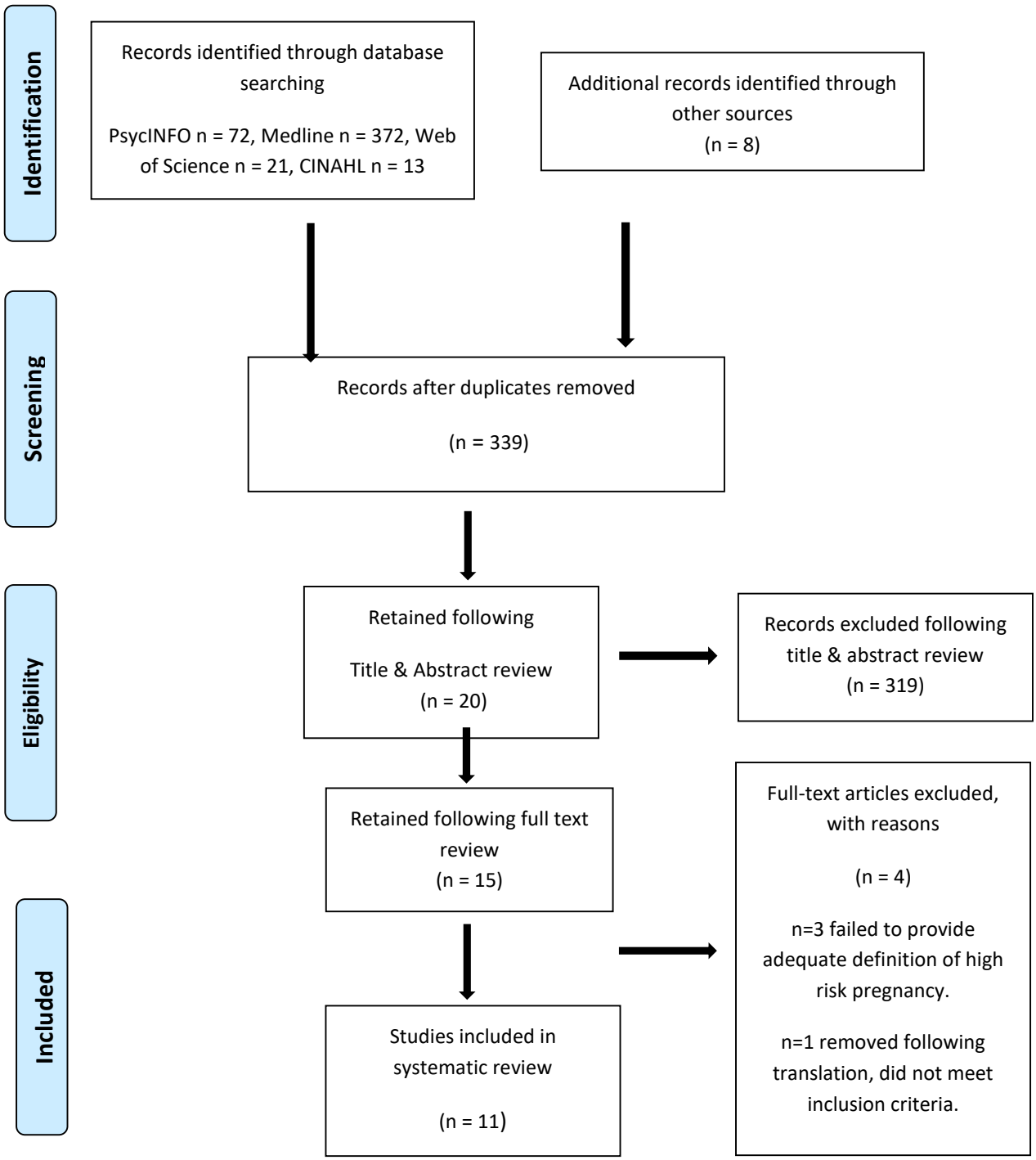
Identification
Records identified through database searching
PsycINFO n = 72, Medline n = 372, Web of Science n = 21, CINAHL n = 13
Additional records identified through other sources
(n = 8)
Screening
Records after duplicates removed
(n = 339)
Eligibility
Retained following
Title & Abstract review
(n = 20)
Records excluded following title & abstract review
(n = 319)
Retained following full text review
(n = 15)
Full-text articles excluded, with reasons
(n = 4)
n=3 failed to provide adequate definition of high risk pregnancy.
n=1 removed following translation, did not meet inclusion criteria.
Included
Studies included in systematic review
(n = 11)

Table 1: Study Characteristics

1st author, year, country	Study Design	N	Control group/N	Assessment timing	Gestational Age (M ± SD)	Maternal Age (M± SD)	Type of pregnancy related illness	MFA Instrument	Summary of findings
Brandon 2008, USA	Cross-sectional	129	n/a	Prenatal	7-38 weeks (28.2 ±5.2)	27 ± 17-44	Hypertension (6.2%), Incompetent cervix (27.1%), Premature rupture of membranes (23.3%), placenta previa (3.1%), toxaemia (9.3%), diabetes (3.1%), Preterm labour (43.4%), multiple pregnancy (13.2%)	MAAS	Approx. 11% of the variance in MFA can be accounted for by higher levels of depression.
Chazotte, 1995, USA	Cross-sectional	30	LRP/30	Prenatal	34-46 weeks	25.7 ±6.25	Gestational diabetes (50%), women at risk for preterm delivery (50%)	MFAS	No differences in MFA found across groups
Curry, 1987, USA	Cross-sectional	75	n/a	Prenatal	20-37 weeks (29.7)	25.5 ±5.33	Hospitalised pregnant women for bleeding (29.3%), rupture of membranes (25.3%), premature labour (17.3%), hypertension (5.3%), polyhydramnios (2.7%), combination of pregnancy problems (6.7%)	MFAS	No difference between groups on MFA
Kemp, 1987, USA	Cross-sectional	32	LRP/54	Prenatal	28-39 weeks	27.0	Premature labour (12.5%), placenta previa (15.6%), gestational diabetes (24%), pregnancy induced hypertension (18.7%), fetal intrauterine growth retardation (6.25%)	The Prenatal Tool	No significant differences found between groups on MFA
McCormack, 2011, Ireland	Prospective case controlled	32	Women without HG/41	Prenatal	7-16 weeks; >26 weeks (9.66 ±2.79)	NR	Hyperemesis gravidarum	MAAS	HG shown to compromise early attachment, but effect size was

									small and had faded by 26 weeks' gestation
Mercer, 1988, USA	Cross-sectional	153	LRP/218	Prenatal	24-34 weeks	28.54 ±5.46	High risk women hospitalised for a pregnancy complication (pre-term labour, premature rupture of membranes, preeclampsia, hypertension, placenta previa, bleeding, GDM)	MFAS PFAS	No significant differences observed between groups or their mates
Mercer, 1994, USA	Longitudinal	121	LRP/182	Prenatal	24-34 weeks; 1,4, & 8 months PP	28.8 ±5.28	Hospitalised women for preterm labour & premature rupture of membranes (72%), pre-eclampsia (8%), bleeding or placenta previa (4%), diabetes (3%)	MFAS	MFA found to be predictive of maternal role competence among high risk women
Pisoni, 2015, Italy	Cross sectional	43	LRP/37	Prenatal	28-32 weeks (31.46, ±1.92)	32.53 ±4.73	Hospitalised pregnant women (cervical insufficiency (20.1%); premature rupture of membranes (11.6%); hypertension (4.6%); placenta previa (4.6%); metrorrhagia (4.6%); intrauterine growth restriction (13.9%); placental abruption (2.3%); polyhydramnios (2.3%), symptoms of premature birth (30.2%)	MAAS PAAS	Hospitalised expecting parents at risk of preterm delivery develop less attachment to the fetus and higher levels of anxiety, depression when compared to control group
Schroeder-Zwelling, 1986, USA	Prospective, case control	20	LRP-without diabetes/20	Prenatal & Postnatal	28-32 weeks; 2-3 days PP; 6 weeks PP	NR	Women with diabetes (14 pre-existing and 6 GDM)	Mother infant rating scale	No effect found for Mother-infant attachment

Ustunsoz, 2009, Turkey	Cross-sectional	58	LRP/86	Prenatal	Unknown	26.68 ±5.34	High risk pregnant women (diabetes, pre-eclampsia, multiple pregnancy, stillbirth, history of abortion)	MFAS PFAS	No sig difference on MFA between groups
White, 2008, Ireland	Cross sectional	87	n/a	Prenatal	>24 weeks (33.4 ±3.79)	30 ±5.6	N = 87 Women hospitalised for a pregnancy related complication (high blood pressure, UTI, raised liver enzymes, placenta previa, premature rupture of membranes, bleeding)	MAAS	Found that maternal perceptions of risk are important in the prediction of MFA.

Study Characteristics

Table 1 provides an overview of the included studies. All publications were journal articles and all studies were published in English. Seven studies were conducted in the United States of America, two in Ireland, one in Italy, and one in Turkey. This represents a multi-national geographical spread, albeit all studies include Western populations. Eight studies were cross-sectional, two were prospective case control design and one was longitudinal. The total sample size for all studies was n = 1448. Individual sample sizes ranged from 30 to 371, with most studies (n=7) having less than 100 participants. All bar one study (Schroder-Zwelling and Hock, 1986) was conducted in the prenatal period. Regarding gestational age at assessment, the sample was quite homogenous, eight studies (74.7%) included women in their second to third trimester, one study (8.3%) included women in their first to second trimester, one study included first to third trimester (8.3%), gestational age for one study is unknown. Only one study (McCormack et al., 2011) collected data during different time points prenatally. The mean maternal age was 25.90 with a range of 14-45. However, information on maternal age was not available for two studies. The majority of samples were non-random and convenience in nature. All participants were recruited from hospital or obstetric clinics.

A range of terminology and diagnostic criteria were used to define the samples including: high risk pregnancy (n=7); pregnancy complications (n=1); at risk of pre-term delivery (n=1); the remaining two studies referred to specific diagnoses i.e. ‘hyperemesis gravidarum’ and ‘gestational diabetes’. Variation was also observed in classification of pregnancy complication. Three studies classified obstetric risk using the Hobel Pregnancy Risk Scale (Brandon et al., 2008; Curry, 1987; Mercer, 1988); one used ICD-10 codes (McCormack et al., 2011); and one reported use of a bespoke

risk scoring index determined by a doctor with speciality knowledge of maternal fetal medicine (White et al., 2008). The remaining studies (n = 6) did not report use of a standardised measure of obstetric risk.

A range of instruments were used to measure attachment including the MFAS (n=5); the MAAS (n=4), the Prenatal Tool (n=1) and the Mother Infant Rating Scale (n=1). More information on instruments can be found in Appendix F. The variation used to classify samples and measure MFA is problematic and introduces bias into studies. It also renders studies more difficult to replicate to determine validity and reliability of findings. The majority of studies discussed a broad range of pregnancy complications within their samples including: bleeding, cervical insufficiency, gestational diabetes, gestational hypertension/pre-eclampsia, hyperemesis gravidarum, intrauterine growth restriction, placenta previa, placental abruption, polyhydramnios, premature labour, pre-term delivery, premature rupture of membranes (PROM), symptoms of premature birth. Two publications focused on diabetes, and one study focussed on hyperemesis gravidarum.

Risk of bias

Table 2 presents an overview of the quality ratings of published articles. The quality of studies ranged from ratings of ‘poor’, ‘fair’ and ‘good’. Eight studies were rated as ‘fair’ and three studies were rated as ‘good’. The author rated all studies and a second rater independently rated 3 studies (25%) (NICE, 2012). Any ambiguity was discussed amongst the research team. The second rater, who was not part of the research team was blinded to the ratings of the first rater. Inter-rater reliability was moderate to substantial (k = 0.58). Reliability checks were discussed with the research team during the review process, who provided clarity on aspects of disagreement.

Table 2: National Institute of Health, National Heart, Lung and Blood (NIH NHLBI) Quality Assessment Tool for Observational, Cohort and Cross-Sectional Studies

Criteria	Brandon, 2008	Chazotte, 1995	Curry, 1987	Kemp, 1987	McCormack, 2011	Mercer, 1988	Mercer, 1994	Pisoni, 2015	Schroeder-Zwelling, 1986	Ustunsoz, 2009	White, 2008
Was the research question or objective in this paper clearly defined?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Was the study population clearly specified and defined?	✓	x	x	✓	✓	x	✓	✓	x	✓	x
Was the participation rate of eligible persons at least 50%?	✓	NR	NR	NR	✓	✓	CD	✓	x	✓	✓
Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study pre-specified and applied uniformly to all participants?	✓	NR	✓	x	✓	✓	✓	✓	✓	✓	✓
Was a sample size justification, power description, or variance and effect estimates provided?	x	✓	x	x	✓	x	NR	✓	NR	NR	NR
For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?	NA	NA	NA	NA	✓	NA	✓	NA	✓	NA	NA
Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?	NA	NA	NA	NA	✓	NA	✓	NA	x	NA	NA

Note: NA = not applicable; NR = not recorded; CD = cannot determine,

For exposures that can vary in amount of level, did the study examine different levels of the exposure as related to the outcome (e.g. categories of exposure, or exposure measured as continuous variable)?	NA	NA	NA	NA	✓	NA	✓	NA	✓	NA	NA
Were the exposure measures (IV) clearly defined, valid, reliable, and implemented consistently across all study participants?	✓	✓	✓	✓	✓	✓	✓	CD	✓	✓	✓
Were the exposure(s) assessed more than once over time?	NA	NA	NA	NA	✓	NA	✓	NA	✓	NA	NA
Were the outcome measures (DV) clearly defined, valid, reliable, and implemented consistently across study participant's?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Were the outcome assessors blinded to the exposure status of participants?	NA	NR	NR	NR	NR	NR	NR	NR	CD	CD	NR
Was loss to follow-up after baseline 20% or less?	NA	NA	NA	NA	x	NA	NR	NA	NR	✓	NA
Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Overall rating	Good	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair	Good	Fair

Results of individual studies

Diversity of definitions used to describe and define group populations, constructs used to measure MFA, and the inconsistency in reporting of outcomes precluded a statistical synthesis of the included results. Therefore, a narrative synthesis is presented. A summary of results by study design will be discussed initially, followed by a breakdown of findings by how authors defined pregnancy complication (either broadly, {e.g. placenta praevia, premature labour, diabetes} or specifically {e.g. gestational diabetes, hyperemesis gravidarum}); finally results will be discussed by timing.

Study Design

Of the eight cross-sectional studies included, five report no differences in MFA scores between women with pregnancy complication and healthy controls (Chazotte et al., 1995; Curry & Snell, 1987; Kemp & Page, 1987; Mercer et al.,1988; Ustunsoz, 2009). One study (Pisoni et al., 2015) found women with pregnancy complication to have lower levels of MFA when compared to controls. One study (White et al., 2008) observed that maternal subjective appraisal of risk to pregnancy was influential in the prediction of MFA. One study observed levels of maternal depression to be influential in the prediction of MFA (Brandon et al., 2008). Results of prospective case control studies were similar. McCormack et al., (2011) found an early negative effect for MFA when symptoms of pregnancy illness were most severe; however, this effect was small and limited to the duration of the pregnancy condition. Schroeder-Zwelling and Hock (1986) found no differences on MFA between at risk sample and healthy controls. A

longitudinal study (Mercer & Ferketich, 1994) reported no differences between women with pregnancy complication and their healthy counterparts.

Pregnancy complication group

Broadly grouped pregnancy related illness

Women with varying types of pregnancy complication were grouped together in eight studies. Five studies (Brandon et al., 2008; Curry & Snell, 1987; Kemp & Page, 1987; Mercer & Ferketich, 1994; Pisoni et al., 2015) reported frequencies of illness type including: gestational diabetes (30.1%), intrauterine fetal growth restriction (20.15%), hypertensive disorders (52.1%), incompetent cervix (47.2%), metrorrhagia (4.6%), multiple pregnancy (13.2%), placenta previa (56.6%), placental abruption (2.3%), polyhydramnios (5%), pre-term delivery/labour (103.3%), PROM (132.2%). The three remaining studies also included the same conditions. Only one study reported pregnancy complication to be associated with lower levels of MFA (Pisoni et al., 2015); all other studies found no significant differences on MFA when compared to controls or to normative data (Curry, 1987). The MAAS, MFAS and Prenatal Tool were used to measure MFA.

Diabetes

Two studies reported on MFA in women with diabetes during the third trimester. Schroeder-Zwelling & Hock (1986), compared attachment in pregnant women with pre-existing diabetes, gestational diabetes and women without diabetes at three time points postnatally. No differences were found between groups at any time point. Chazotte et al. (1995) focussed on the association between receiving a diagnosis of and treatment for gestational diabetes, and its impact on MFA in three groups of women (women with gestational diabetes, women at risk for pre-term delivery, and

pregnant low risk women). No differences were found between the three groups on MFA. A pattern suggests that any ill effects of having gestational diabetes may have resolved by the time measurement of MFA occurred. The natural lapse of time from diagnosis to measurement may have allowed the mothers to adjust to developing gestational diabetes.

Hyperemesis Gravidarum

One study (McCormack et al., 2011) reported on the impact of hyperemesis gravidarum (HG) on maternal fetal attachment. This study was conducted over two time points beginning in early pregnancy (7-16 weeks) and finishing in the third trimester (after 26 weeks). The study found that if HG does impact typical MFA during pregnancy, then it does so only in regards to the quality of attachment and is time limited to early pregnancy when experience of HG is most severe. This negative effect was small. The authors reported that as pregnancy progresses and HG symptoms resolve or reduce, no differences were found between HG participants and healthy controls on MFA.

Timing and Setting

The results suggest a pattern relating to gestational age and MFA. Women who were assessed for MFA earlier in pregnancy were more likely to show lower levels of attachment when compared to healthy controls, with MFA scores elevating to match healthy controls later in pregnancy when symptoms associated with pregnancy illness have resolved. Indeed, gestational age is well regarded as a predictor for MFA in healthy cohorts (Yarcheski et al., 2009). However, many of the studies reporting non-significant differences between groups assessed MFA later in pregnancy and focussed on women hospitalised for obstetric risk. This may bias the results

somewhat, as healthcare staff will naturally promote sensitive maternal behaviours such as fetal monitoring, known to improve rates of attachment. For example, participants in the study by Schroeder-Zwelling & Hock (1986) were encouraged to count fetal movements and experienced weekly ultrasound scans and fetal monitoring in treatment. Whilst this highlights the benefit of well attuned healthcare staff in the promotion of maternal-fetal attachment, it may not represent experiences of the general population. Thus, findings should be interpreted with caution as they cannot be generalised to women who have not been hospitalised for a pregnancy complication, and are limited to women from Western countries who have access to good quality healthcare systems.

4. DISCUSSION

Summary of evidence

This review systematically evaluated the evidence relating pregnancy complication and maternal fetal attachment. Based on the findings of the 11 papers which met the inclusion criteria, the results were mixed. Some studies report an impact on MFA in women with pregnancy complication, but also suggest that this effect may be time limited, and to have no long-term impact on the prenatal attachment process. Some studies suggest that MFA is not impacted by pregnancy induced illness in of itself. Rather, if the maternal fetal attachment process is negatively affected by the occurrence of physical illness during pregnancy, then this association is explained by several different correlated risk factors such as social support including spousal support, pre-existing mental health condition, pregnancy intendedness, and how the pregnant mother appraises the risk of her pregnancy illness to her own life and to her

fetus. The potential influence of attuned healthcare staff on MFA was also evident, with samples exposed to regular fetal monitoring and fetal counting showing no differences in MFA when compared to controls.

Essentially the findings of this review highlight a group of women and their partners who are often excluded from research studies, culminating in a paucity of research which is equivocal in nature. The research that has focussed on these groups of women is blighted by low methodological quality, summarised by a lack of unitary definition, mixed samples of medically at risk women (e.g. gestational diabetes, women with HG, women at risk for pre-term delivery), and a lack of follow up. Variation in measurement of maternal fetal attachment and gestational timing of assessment have mottled the appraisal of results and no definitive conclusion can be drawn due to lack of heterogeneity. This leads to further ambiguity of results.

Influencing factors

Subjective appraisal of risk

How a mother appraises the risk of having a pregnancy complication may be a contributing factor when considering impact on MFA. White et al. (2008) reported that maternal subjective appraisal of risk may differ substantially from objective medical assessment of pregnancy risk; and women's appraisal of the threat of a complicated pregnancy influences the type of coping strategy utilised (Lazarus & Folkman, 1984). When a woman appraises a threat to pregnancy as high and uses an emotional focussed coping style (as opposed to a positive appraisal coping style), lower levels of MFA are predicted. As such, maternal perception of risk, and style of coping, may moderate the association between pregnancy complication and maternal fetal attachment.

Experience of hospitalisation

A mother's experience of hospitalisation for pregnancy risk may also influence the development of MFA. Historically, the literature suggests that difficulties in the attachment relationship may be a protective strategy for the pregnant mother to be (Jones, 1986; Pisoni et al., 2015). This is to mitigate against the potential trauma of loss of pregnancy. Attachment theory (Bowlby 1969) would suggest that difficulties in developing attachment to the fetus may be interrupted as the mother to be is not able to experience varying milestones due to the impact of feeling so unwell during pregnancy. Thus, MFA may just be delayed as opposed to impaired. This is in line with evidence reported by McCormack et al. (2011), who found MFA to be impacted early in pregnancy, but for this impact to be self-limiting to the duration of pregnancy, and to match levels of MFA in healthy controls once illness resides. Conversely, evidence by Mercer & Ferketich (1990) suggests that pregnancy induced illness strengthens the bond between mother and fetus. The potential loss of pregnancy may attribute an even stronger meaning and importance of pregnancy to the mother suffering the illness. Factors such as the impact of hospitalisation on financial stresses, spousal support and ability to parent other children are also noteworthy, however, beyond the scope of discussion in this review.

For women hospitalised with pregnancy complication, the health system may play a pivotal role. Evidence by Chazotte et al. (1995) found no differences in level of MFA across three groups (women with pre-term labour, women with a mixture of pre-existing diabetes and gestational diabetes and a healthy control group). In this study, all groups of women were supported to recognise and count fetal movement. The study reported that the philosophy of care providers whose approach emphasises patient education may have influenced high levels of MFA across the board.

Additional findings

Maternal mental health

Three studies (Brandon et al., 2008; Mercer et al., 1988; Pisoni et al., 2015) reported on the association of maternal-fetal attachment and maternal mental health. Mercer et al., (1988) found a weak inverse correlation between MFA and depressive symptoms in healthy pregnancies, but found no relationship between depression and MFA in women with pregnancy complication. Pisoni et al. (2015) found that while rates of anxiety and depression were higher in women with pregnancy complication, compared to healthy controls, MFA was not found to be related to anxiety or depression scores. Similarly, Brandon et al., (2008) observed a higher prevalence of depression in women with obstetric risk, however, only relationship satisfaction was found to be significantly associated with pregnancy complication. As such, MFA may be an independent variable not affected by maternal mental health during pregnancy hospitalisation.

Paternal fetal attachment

Paternal fetal attachment (PFA) was discussed in three studies (Mercer et al.,1988; Pisoni et al., 2015; Ustunsoz et al., 2009) Authors found that PFA is inversely related to women's depression scores. This study also reported a significant positive relation between women and their partners for prenatal attachment. Ustunsoz et al. (2009) found that when comparing risk groups (couples with pregnancy complication versus a low risk pregnancy), PFA score was negatively affected by risk status. Mercer at al. (1994) found that male partners of women experiencing pregnancy complication showed greater levels of worry, anxiety and concern than their low risk counterparts and less positive attachment behaviour than comparisons. However, neither group

differed on scores of PFA. Given the importance of spousal support in maternal wellbeing and maternal fetal attachment (Yarcheski et al., 2009), there is a substantial lack of evidence exploring the impact of pregnancy complication on fathers. This is a direction for future research.

Qualitative findings

Two studies discussed qualitative findings which were observed during clinical interview with participants. Curry (1987) found that women provided a more holistic and robust appraisal of their feelings about pregnancy, noting some women reporting ambivalence about pregnancy and 'changing feelings regarding the wish for the pregnancy to be over' (p179). Mercer and Ferketich (1994) also found that male partners reported greater worry and concern about the pregnancy during interview, however, did not differ on scores of MFA when compared to male partners of low risk pregnant women. The indication of dissonance matches with qualitative evidence reported by Meighan and Wood (2005) and may offer a richer understanding of the complexities of prenatal and postnatal attachment for mothers and fathers. The need for further qualitative studies exploring maternal perceptions of pregnancy complication and attachment is warranted.

Limitations of the current review

This review has several limitations. Firstly, the findings of this review are limited by methodological assessment of the papers included. The main source of potential bias

appears to be in sample selection. This is compounded by the varying terminology used within the literature to describe the domain of pregnancy induced illness and a lack of widely accepted diagnostic criteria, meaning that sample selection was varied between studies and open to interpretation. The degree of heterogeneity reported in this review is also a significant limitation. It is explained by varying factors including: type of MFA measurement used, selection and definition of cases/comparisons, and timing of assessment period. Half of the studies reviewed are from the 1980 and 1990s. Given the advances in healthcare provision, diagnosis and treatment, there may be fundamental differences between diagnosis and treatment of pregnancy complication in the 80's and in the present day. As such, findings from this era may not be generalizable to the current day. Secondly, most publications have focussed on attachment in the prenatal period, as such, studies cannot be substantively generalised to the postnatal period. More research is warranted postnatally. Thirdly, most identified studies assessed samples from Western societies and populations of women hospitalised for obstetric risk. As such, generalisation of results may be restricted to study populations. Finally, regarding the search criteria, grey literature was not included, limiting the results to published studies that were identified by electronic or reference search only.

Quality assessment

The main limitations of the tool applied relates to its applicability with three different study designs, namely: cohort, observational and cross-sectional studies. Consequently, not all questions asked will be relevant to each type of study. For example, questions six, seven and eight refer to elements regarding 'exposure assessed prior to the outcome measure'; 'observing a sufficient timeframe to see an

effect'; and 'measuring different levels of the exposure of interest'. This type of question is not applicable to a cross-sectional research design. For example, cross-sectional analyses are conducted where exposure and outcomes are measured at the same time thus this question is rated as a 'NA'; cross-sectional analyses allow no time frame to see an effect, and thus would be awarded a 'NA' and finally, the presence of pregnancy complication was dichotomous and thus this question was not applicable and awarded a NA. As such, most study designs appraised were cross-sectional which limits the scope of use of this quality appraisal tool over these domains.

Implications for future research

This systematic review has highlighted a number of recommendations for future research. Firstly, discrepancies between risk measuring indices and variations in attachment constructs, lend to great difficulty in the generalisation of study results. Primary research emerging on this subject would be enhanced by using specific risk scoring indices to measure pregnancy induced illness and the application of a unitary construct to measure MFA and PFA. Secondly, whilst the current review reports mixed results, the addition of results from qualitative studies further complicate the matter. It would be interesting to undertake a mixed methods triangulation of results to add depth of understanding to the existing research base. Finally, given the importance of social support in maternal fetal attachment both prenatally and postnatally, the role of fathers is substantially overlooked in the perinatal literature. Further research is warranted to investigate the mediational role of paternal factors in maternal wellbeing and maternal-fetal attachment. Furthermore, research is necessitated to understand the effect of pregnancy complication on paternal wellbeing and how this impacts ability to provide spousal support.

Implications for clinical practice

The overall findings suggest that maternal fetal attachment in women who experienced pregnancy induced illness is a complex and important issue to consider. The results of this review highlight the importance of providing the prospective mother with psychoeducation about her pregnancy. This may entail information about risk appraisal and how coping styles can be an important factor in prenatal attachment. There is preliminary evidence to suggest that using a problem focused style in response to appraisal of threat in pregnancy can positively enhance MFA. Additionally, results suggest the significance of evaluating mother and father together, as the attachment of both parents to the unborn baby may be important for the joint well-being of the couple and consequently for child development (Pisoni et al., 2015). As such, health care practitioners should take care to provide a family centred approach during prenatal and postnatal care.

5. CONCLUSION

Due to equivocal results, no definite conclusion was formed regarding whether the presence of a pregnancy complication effects maternal fetal attachment. Studies have suggested some influencing factors including the impact of paternal fetal attachment, and level of health care support shared with the expectant mother. Expanding on the research base and improving the methodological rigour of studies will enable a more comprehensive understanding on the effects of pregnancy induced illnesses on the development of attachment in the prenatal and postnatal periods

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Title: Reviewing the impact of Hyperemesis Gravidarum on mother-child attachment and parenting stress up to two years' postpartum: a cross-sectional study

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Paper two has been prepared for submission to the British Journal of Health Psychology (see appendix A for submission details).

For ease of reading, figures and tables have been included in the text rather than at the end of the document.

Word count (excluding tables, figures and references): 4,983.

Abstract: (229/250)

Objective: Little is known about the impact of Hyperemesis Gravidarum on parenting stress and maternal attachment in the postnatal period. The aim of this study is to evaluate parenting stress and maternal attachment in women who have had HG and to examine potential predictive psychosocial variables that may influence or account for these factors.

Study design: This study used a retrospective cross-sectional study design.

Method: Data was collected using an online survey from October 2018 through January 2019. Participants included n=83 postnatal women all of whom had HG in pregnancy. Measures included the PSI-SF-4; MAI; PHQ9, GAD7, MOS-SSS, GSE. Data was explored using non-parametric correlational analyses and multiple regression.

Results: One sample t-tests found statistically significant higher scores on parenting stress for women with HG compared to age matched norms ($p<.001$). Maternal attachment was found to be statistically higher than age matched norms ($p<.001$). Multiple regression analysis found that parenting stress was significantly predicted by anxiety, depression, self-efficacy and social support, accounting for 27.4% of the variance. Maternal attachment was significantly predicted by anxiety, depression and social support, accounting for 10.2% of the variance.

Conclusion: Women with HG show high maternal affectionate attachment, but are also observed to have higher levels of parenting stress, Findings suggests that some other unique contributing factors may be at play accounting for elevated parenting stress in women with HG. This warrants further research.

Keywords: Hyperemesis Gravidarum, Maternal Attachment, Parenting Stress, Postnatal period, Maternal mental health

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Reviewing the impact of Hyperemesis Gravidarum on mother-child attachment and parenting stress up to two years' postpartum: a cross-sectional study

1. INTRODUCTION

Background

Up to 70% of all pregnant women experience some form of nausea and vomiting during pregnancy (Dean, et al. 2018). Hyperemesis Gravidarum (HG), known as the severe form of nausea and vomiting in pregnancy (NVP) is thought to affect approximately 0.3 - 3% of pregnancies (London et al., 2017). NVP and HG is a leading cause of hospitalisation during pregnancy (Gazmararian et al., 2002). Reports from a recent study suggest NVP to cost the UK National Health Service (NHS) in the region of £62,373,961 per year (Gadsby et al., 2019). Despite its physical and economic impact, HG remains an elusive diagnosis with conflicting variation in epidemiology, clinical diagnosis, and aetiology (London et al., 2017).

Aetiology

Many individual aetiological theories underlying HG have been reported. Physiologically, hormonal hypotheses have postulated high levels of oestrogen, progesterone, and human chorionic gonadotropin (hCG) as a causal factor (Derbent, Yanik, Simavli et al., 2011; Kimura, Amino, Tamaki et al., 1993). However, conflicting reports exist, somewhat limited to small sample sizes and to the addition of patients with NVP as well as HG; therefore, no causal associations have been confirmed (Dean & Shortman, 2014; Dypvik et al., 2018). Helicobacter pylori (H.pylori) has also been correlated with HG, however the strength of correlations suggest that H.pylori is not

likely to be a main mechanism. (Li L., et al., 2015; Golberg, Szilagyi & Graves, 2007). Psychodynamic theories are less commonly accepted. These include HG as a rejection of the foetus or womanhood (Munch, 2002); lack of emotional support from husband and parents (Wolkind & Zajicek, 1978), and personality pathology (Fairweather,1968). Conversely, a comparison study of psychological traits concluded that the condition is not psychosomatic, but a complex interaction of biological, psychological, and sociocultural factors (Simpson et al., 2001).

One of the more dominant theories suggests a link between HG and genetic factors. Recent twin studies (Colodro-Conde et al., 2016) and family history studies (Fejzo et al., 2018) reveal strong support for a high heritability rate of the condition. Further support for genetic components has been founded in genome wide studies linking genetic variations of two genes (GDF15 & IGFBP7) to NVP and HG (Fejzo et al., 2018). GDF16 and IGFBP7, the genes involved in placentation and feeding behaviour have also been associated with cachexia, a disease with symptoms like HG including nausea, vomiting, weight loss, anorexia and muscle wasting (Fejzo et al., 2019). For a review of aetiology see London et al., (2017), and Dean and Shortman (2014).

Risk factors

Many risk factors have been associated with HG. Women are more likely be young, primiparous mothers who are non-Caucasian (Boelig et al., 2016), of lower SES (Karaca et al., 2004; Mullin et al., 2012), and who have a history of anxiety and depression (Fell et al., 2006; Uguz et al., 2012). However, these factors need to be interpreted with caution. The lack of unified diagnostic criteria, and a tendency towards cultural and ethnic homogeneity in samples studied, may well skew the results. Recent

guidelines now suggest HG can be diagnosed when there is protracted NVP, with the triad of more than five percent pre-pregnancy weight loss, dehydration and electrolyte imbalances (Royal College of Gynaecologists, 2016).

Psychosocial outcomes

The impact of HG is far reaching and can include: financial problems, difficulties in maintaining employment or attending an educational facility, marital problems, family relationship problems, social isolation, and changes in attitudes regarding future family planning including the consideration of therapeutic termination or sterilisation (Dean et al., 2018; Poursharif et al., 2008). A meta-analysis has found a significantly increased frequency of depression and anxiety in women with HG (Mitchell-Jones et al., 2016). Support has also been found for low self-esteem (Ezberci et al., 2014) and post-traumatic stress disorder (Christodoulou-Smith et al. 2011). Research on the longevity of morbidity is mixed. One study found women with HG to have a strong rebound in psychological wellbeing once physical recovery was achieved (Tan et al. 2014). Conversely, Poursharif et al. (2008), report a longer lasting impact of HG, retaining its effect in the postnatal period.

Mother-child attachment and HG

Attachment, the emotional bond which typically forms between infant and caregiver, is thought to begin from 10 weeks' gestation, increasing significantly as the pregnancy progresses (McCormack, Scott-Heyes & McCusker, 2011). The attachment relationship is responsible for the social, emotional and cognitive development of the infant. Interruptions to the typical development of mother-infant attachment in healthy pregnancy have been studied extensively in the literature (Alhusen, 2008; Gaffney,

1988; Muller, 1992, Erikson, 1996, Yarcheski et al. 2009). Factors such as mother's own attachment style (Hairston et al. 2018), anxiety and depression (Rossen et al., 2016) maternal self-efficacy (Leahy-Warren. McCarthy & Corcoran, 2011), social support (O'Hara et al., 2017), younger maternal age, and socioeconomic status (Alhusen, 2008) have all been associated with poorer attachment outcomes in the postnatal period. Due to a paucity of studies examining the postnatal impact of HG, less is known about maternal attachment for this population.

Prenatal factors including mental health, maternal-fetal attachment (MFA), pregnancy intendedness and pregnancy complication have been reported as important predictors in mother child attachment postnatally (Branson et al., 2008; Erikson, 1996; Gaffney, 1988; Muller, 1992; Rossen et al., 2016). Less is known about pregnancy complication as this population is usually excluded from research studies. Of the available literature reporting on attachment and postnatal outcomes for women with pregnancy complication, results are conflicted (Avant, 1981; Boudreaux, 1981; Curry & Snell, 1985; Penticuff, 1982). A similar pattern is apparent in the HG literature. Meighan and Wood (2005) suggest the presence of HG can render a woman so ill that she is unable to become emotionally attached to the foetus. Conversely, McCormack et al. (2011) report that while MFA may be affected during pregnancy in women with HG, the effect size is small and self-limiting to the duration of HG symptoms. Whilst it is well agreed that prenatal and postnatal attachment is critical for maternal and child outcomes, the extent to which the usual development of maternal attachment may be disrupted by a condition such as HG in the postnatal period is unknown.

Parenting stress and attachment

Parenting stress can be defined as “the aversive psychological reaction to the demands of being a parent” (Deater-Deckard, 1998, p315). Parenting stress is thought to arise when the parent-child system is under strain, and when there is a mismatch between available psychological resources and the demands of parenthood. (Abidin, 1995; Deater-Deckard,1998; Moe et al., 2018). Research suggests that parenting stress can alter how parents experience their parental role, parental perceptions of how difficult the infant is, and the quality of parent-child attachment (Vismara, et al., 2016). However, if a relationship does exist between parenting stress and parent-child attachment, it’s directionality is unknown. For example, for some mothers who find parenting to be more stressful, they may be more likely to form poorer attachments to their children. Conversely, more insecurely attached children may be more stressful to parent. Furthermore, understanding if stressful experiences in the prenatal period, such as HG, can predict parenting stress or maternal attachment then interventions can be more appropriately armed to target populations.

Protective factors

A 2008 review by Alhusen on maternal fetal attachment reported factors that improve attachment outcomes are related to socioeconomic factors. These include access to regular prenatal care, regular ultrasound appointments, stable family functioning and social support. However, a review by Yarcheski et al. (2009), found limited effect for socio-demographic factors, but a greater effect for social support on attachment. Discrepancies between findings may be reflective of the poor methodological quality of studies and the need for further research. Others have reported maternal mental health and wellbeing to be linked to lower levels of parenting stress and enhanced maternal attachment to infant. Furthermore, social support and self-efficacy have been

found to be protective against parenting stress through their association with increased perception of personal resources and reduction of perceived demands (Bloomfield & Kendall, 2012; Crninc & Greenberg, 1990; Crnic & Booth, 1991). The role of mental health, social support and self-efficacy is apparent when considering parenting stress and maternal attachment. However, much of this research has been conducted on healthy pregnant and postnatal populations, leaving a dearth of research on women with pregnancy complication such as HG.

Predicting postnatal attachment and parenting stress

Generally, certain groups including women with serious medical or physical problems in pregnancy, are more vulnerable to psychological and psychosocial problems postnatally (Zagar, 2009). A woman's psychosocial experience of HG may include lifestyle changes, such as prolonged bed rest or hospitalisation, social isolation, absence from career, financial impact, emotional reaction to the loss of an idealised pregnancy and wider systemic impacts on partners and other children may heighten vulnerability to postnatal difficulties (Dean et al., 2018; Poursharif et al., 2008). Furthermore, emerging research has found that mothers who experience high levels of stress or anxiety during pregnancy are also more susceptible to parenting stress (Huizink et al., 2017). These findings are in line with research reporting how maternal mental health difficulties hamper the ability to activate the psychological resources needed to cope with the transition to parenthood and parenting role attainment, leading to increased parenting stress (Huizink et al., 2017; Webster-Stratton, 1998; Whiffen & Gotlib, 1989). Whilst these factors have been observed in women with healthy pregnancies, much less is known about how they affect women with HG in the postnatal period. Garnering a better understanding of the postnatal effects of HG can

help to inform services and interventions to meet the needs of the woman, her infant and wider family.

Rationale for the current study

HG is a pregnancy complication which can impact the mother physically, socially and emotionally during pregnancy. However, much less is known about the postnatal impact of HG. Understanding how parenting stress and maternal attachment may be impacted by a HG pregnancy is important when considering how these factors have been observed to impact maternal and child outcomes in otherwise healthy pregnancies (Alhusen, Hayat & Gross, 2013; Huiznik et al., 2017). To understand postnatal impact of HG, this study aims to examine parenting stress levels and maternal attachment associated with a HG pregnancy; and predictors of parenting stress and maternal attachment in women who have experienced HG. Our hypotheses are:

H1: Parenting stress levels will be higher in women with HG when compared to age matched clinical and non-clinical samples.

H2: Maternal affectionate attachment will be lower in women with HG when compared to age matched clinical and non-clinical samples.

H3: Parenting stress will be predicted by elevated anxiety, depression and lower levels of self-efficacy and social support.

H4: Maternal attachment will be predicted by lower levels of anxiety and depression, higher self-efficacy and social support.

2. METHOD

Design

A cross-sectional study was carried out to explore the association between parental stress and maternal attachment in women with HG pregnancy.

Sample

Participants were n = 111 women who had experienced a pregnancy affected by Hyperemesis Gravidarum in the last 24 months. Inclusion criteria required participants to be English speaking, be aged over 18 years of age and to have had a singleton pregnancy which was impacted by HG. Participants were excluded from the study if they did not meet the inclusion criteria. Data was collected between October 22nd 2018 to January 31st 2019. Of the 111, n=83 provided complete information. Participants with incomplete data on parenting stress and maternal attachment and each of the predictor variables were excluded from analysis (n = 28).

Recruitment

Participants were recruited using social media platforms. A third sector charity (Pregnancy Sickness Support) advertised the study and shared a link on their various social media platforms (Facebook, Instagram and twitter). The study was also advertised by the research team using social media platforms to support the recruitment process. All women with experiences of HG were invited to participate.. As this study was retrospective in nature, and in the absence of a retrospective measure of pregnancy sickness, the research team felt that experiences of severity could not be reliably and objectively measured. Thus, a measure of HG severity was not included in this study.

Measures

Demographic and Obstetric factors

All participants were asked to provide information regarding their ethnicity and nationality, education level, annual household income and marital status. Participants were also asked about their obstetric history. Questions included, age during HG pregnancy; number of pregnancies affected by HG; number of pregnancies resulting in live births, miscarriages and terminations; and number of times hospitalised for HG. HG was defined as prolonged nausea and vomiting leading to hospitalisation before the 25th gestational week.

Postnatal factors

Parenting Stress Index-Short Form (PSI-SF-4)

The PSI-SF-4 is an abbreviated version of the full 101 item PSI. The 36 items in the PSI-SF are broken into three domains, Parental Distress (PD), Parent-Child Dysfunction Interaction (P-CDI) and Difficult Child (DC), which combine to form a total stress scale. Brief descriptions of the PSI-SF scales are presented in Appendix G. The reported internal reliability coefficient for Total Stress score is .91, with those for subscales ranging from .79 to .90 (Haskett et al., 2006). Concurrent validity and predictive validity have been demonstrated for the full-length version, which is highly correlated with the short form (r =0.94) (Abidin, 2012). Items are rated on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree); higher total score is indicative of higher overall parenting stress. Reliability for the current sample was α =.94

Maternal Attachment Inventory (MAI)

The MAI is a 26-item scale designed to measure mother-infant attachment. Items are rated on a Likert scale ranging from 4 (almost always) to 1 (almost never). Higher scores indicate greater attachment between mother and infant. The possible range of scores is 31 to 124. The MAI has shown high validity (α=0.90) and reliability (α=0.85). Reliability for the current sample was α =.96

Patient Health Questionnaire-9 (PHQ-9)

The PHQ-9 is a 9-item measure designed to facilitate the recognition of depression. Each item asks the individual to rate the severity of their symptoms over the past two weeks. Items are rated on a Likert scale ranging from 0 (not at all) to 3 (nearly every day). With a cut-off score of 10, any person scoring 10 or above is considered to be suffering from clinically significant symptoms of depression. Research indicates the PHQ-9 to show excellent reliability and validity (Kroenke, Spitzer, Williams, 2001) and to be highly specific in identifying postpartum depression in women (Gjerdingen et al., 2009). Reliability for the current sample was α = .93.

Generalised Anxiety Disorder Questionnaire (GAD-7)

The GAD-7 is a 7-item instrument used to measure the presence and severity of generalised anxiety. Each item asks the individual to rate the severity of their symptoms over the past two weeks. Items are rated on a Likert scale ranging from 0 (not at all) to 3 (nearly every day). With a cut-off score of 10, a score of 10 or above is considered an indication of clinically significant symptoms of generalised anxiety. Research indicates the GAD-7 to show excellent internal consistency, good test-retest reliability and strong criterion validity (Spitzer et al., 2006; Lowe, et al., 2008). The GAD7 has been shown to be highly sensitive and specific in the detection of anxiety

in perinatal women (Simpson et al., 2014). Reliability for the current sample was α =.95

General Self-Efficacy (GSE)

The GSE is a 10-item measure of general self-efficacy. Items are rated on a Likert scale from 1 (not at all true) to 4 (exactly true). Total GSE score ranges between 10 and 40, with a higher score indicating higher self-efficacy. This scale has been found to negatively correlate with depression, stress, health complaints, burnout and anxiety. Internal reliability is estimated between .76 and .90. (Schwarzer & Jerusalem, 1995). Reliability for the current sample was α = .92

The Medical Outcomes Study Social Support Index (MOS-SSI)

The MOS-SSI is a 19-item instrument containing four subscales: emotional/informational support; tangible support; affectionate support; and positive social interaction. The full-scale measures functional aspects of social support. Items are scored on a Likert scale ranging from 1 (none of the time) to 5 (all of the time). Scores range from 19 - 95, with higher scores indicating more support. The instrument has high reliability and validity in healthy populations and in samples of postnatal women. (α = 0.97) (Sherbourne & Stewart, 1993). Reliability for the current sample was α = .97

Procedure

Data was collected using Qualtrics (Qualtrics, Provo, UT) a password protected online survey platform. Patient and public involvement (PPI) was established through liaison with members of Pregnancy Sickness Support charity (PSS). The survey was advertised on social media platforms (Facebook, Instagram and Twitter) via the PSS

website (https://www.pregnancysicknesssupport.org.uk) and shared by the research team. Online advertisements provided a link which directed women to the study site containing study information. Women were directed through all participant information including anonymity, confidentially and GDPR, before indicating consent and beginning the survey (see Appendix I). The survey could be discontinued at any time by closing the browser window. Participants could enter a prize draw to win an amazon gift voucher worth £50 at the end of the survey. Ethical approval for the study was granted by Cardiff University Ethics Committee.

Sample size was calculated using the G*Power computer programme, to ensure sufficient power for a standard multiple regression analysis. A total sample size of 89 was calculated to be sufficient to provide 95% power for this analysis, with an α of 0.05 ($f^2 = 0.15$, $\alpha = 0.05$, power = 0.95, number of predictors = 3). To ensure sufficient power and sensitivity for independent samples t-test, Power calculation for the total sample of n=83 ($\alpha = 0.05$, power = 0.95), allows for a moderate effect size d=0.4.

Data analysis

The data was analysed using the Statistical Package for Social Sciences v23.0 for Mac (SPSS Inc., Chicago, Il., USA). Descriptive statistics were first used to describe the sample. All continuous variables were assessed for violations of normality using Kolmogorov-Smirnov. Data was non-normally distributed; when assumptions for parametric tests were violated, non-parametric tests were carried out as appropriate. Comparison of means and standard deviations were used to conduct one-sample t-tests between mean PSI and MAI scores of participants from the current study and those of comparative clinical and non-clinical samples.

A linear multiple regression was employed to explore whether parenting stress and maternal attachment can be predicted by anxiety, depression self-efficacy and social support. This method was also chosen to investigate the overall fit of the model and the contribution of each of the predictor variables to the total variance explained. A forced entry method was not employed as this is an exploratory level study and the evidence underpinning which of the predictors are most strongly associated with the dependent variable is not strongly substantiated with this population.

Parenting stress scores were normally distributed, as assessed by Shapiro Wilk's test (p>05), and there were no outliers in the data, as assessed by inspection of a boxplot. There was homoscedasticity, as assessed by visual inspection of a plot of studentised residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. Two studentised residuals greater than ±3 were removed. There were no leverage values greater than 0.2, and values for Cook's distance above 1. The assumption of normality was met, as assessed by a Q-Q Plot. The assumptions of normality, homoscedasticity, multicollinearity and independence of residuals were assessed and met (Durbin-Watson = 1.922). Maternal attachment scores were non-normally distributed. Independence of residuals, as assessed by Durbin Watson was 1.962. The assumptions of homoscedasticity, multicollinearity and normality were assessed and met satisfactorily as per the above checks for the second model.

Table 1: Sample Characteristics

	n	%	UK National Norms
Obstetrics			
Age, (±SD)	28.41 (5.16)		30.34
Primigravida	25	30.1	
Multigravida	58	69.9	
Miscarriage	20	30.1	25%
Termination	12	14.5	20%
Nationality			
British	56	67.4	
Irish	15	18.1	
American	4	4.8	
Other	4	4.8	
Education level			
University or higher	66	79.5	41%
School	17	20.5	37%
GCSE	9	10.8	
A-Levels	8	9.6	
Household income per annum			*£33,830*[*]
<£30,000	16	19.2	
>£30,000	67	80.8	
Marital status			
Married/De facto	76	91.6	
Single	7	8.4	
Mental Health			
Anxiety	35	42.2	7.8%**
Depression	34	41.0	7.8%**

Note: *average income per household in the UK (Statistica, 2019);

**Mental health foundation (2019)

3.RESULTS

The findings are based on responses from n=83 women. This sample represents women whom had experienced a HG pregnancy in the last two years, and who had completed all measures. Most participants were British (55.4%), or Irish (18.1%), and had above average household incomes. Table 1 displays sample characteristics.

Rates of parenting stress and attachment difficulties associated with a HG pregnancy (N = 83)

Do women who experienced a HG pregnancy experience more parenting stress?

A series of one-sample t-tests were calculated to determine whether parenting stress scores in women with HG were different to comparative clinical and non-clinical age matched groups. Results are displayed in Table 2. Mean total stress scores for HG was higher by 13.74 (95% CI, 9.10 to 18.40) than mean scores of women with pre-term infants of 67.0, $t(82) = 5.86$, $p<.005$. Women with HG had lower scores by -11.10 (95% CI, -30.63 to -21.31) than women with depression 106.71 $t(82) = -11.10$, $p<.005$. Women with HG had higher mean scores by 15.74 (95% CI 11.10 to 20.40), than healthy perinatal women 65.0, $t(82) = 6.72$, $p<.005$. All subscales were also statistically significantly different from comparison groups ($p<.005$), apart from women with pre-term infants on the parent-child difficult interaction subscale. In summary, results indicate women with HG to have higher levels of parenting stress when compared to normative data from women with pre-term infants and a healthy perinatal sample.

Table 2: Mean scores and standard deviations for Parenting Stress across comparative samples

	HG study sample		Women with pre-term infants[1]		Women with postnatal depression & suicidality[2]		Healthy perinatal women[3]	
	M	SD	M	SD	M	SD	M	SD
Total stress	80.74	21.34	67.0	17.89	106.71	22.33	65.0	20.3
PD	35.25	10.67	27.09	8.79	42.88	7.27	24.3	7.9
P-CDI	19.21	6.98	18.26	5.51	30.12	10.75	9.0	7.3
DC	26.11	9.45	21.73	6.74	33.71	12.26	21.7	7.5

Note: PD = parental distress; P-CDI = parent-child dysfunctional interaction; DC = difficult child

Do women with a HG pregnancy experience lower levels of Maternal Affectionate Attachment?

A series of one sample t-tests were run to determine any differences between maternal attachment scores of women with HG and age matched comparative groups. Results are presented in Table 3. Women with HG had higher MAI mean scores by 3.32 (95% CI .76 to 5.8), than healthy perinatal women 94.28, $t(82) = 2.58$, $p < .05$. The HG sample had higher scores by 11.39 (CI 8.84 to 13.95), when compared to women with post-natal depression of 86.20, $t(82) = 8.86$, $p < .005$. HG women had lower MAI mean scores by-18.80 (95% CI -21.36 to -16.24) than postnatal women with older children of $t(82) = -14.62$, $p < .005$. Results indicate that HG women had comparatively high levels of affectionate attachment to their infant when compared to an age matched perinatal sample, and significantly higher mean scores when compared to a sample of women with postnatal depression. HG women had lower scores when compared to healthy postnatal women, however this group of women had older children. This is an

[1] Gray et al (2012)
[2] Paris et al. (2009)
[3] Vismara et al. (2016)

important finding, as it indicates that women with HG in pregnancy have strong attachment relationships to their infants regardless of presence of parenting stress or mental health difficulty, when compared to other clinical samples.

Table 3: Mean scores and standard deviations for Maternal Attachment scores across comparative samples

	HG study sample		Healthy perinatal women[4]		Women with postnatal depression[5]		Healthy postnatal women with infants over 2 years of age[6]	
	M	SD	M	SD	M	SD	M	SD
Total MAI	97.6	11.71	94.28	9.74	86.20	12.14	116.4	5.7

Note: MAI = Maternal Attachment Inventory

Predictors of parenting stress and maternal affectionate attachment

Spearman's correlational analyses were conducted on all variables. In line with Tabachnick and Fidell (1996), only correlations between predictors and the discriminant function in excess of 0.33 (10% of variance) are interpreted. Thus, obstetric and demographic variables will not be included in the final analyses. Correlational analyses (Table 4) revealed the strongest predictors for parenting stress were depression, anxiety, self-efficacy and social support. The strongest predictors for maternal affectionate attachment were anxiety, depression and social support.

[4] Shin & Kim (2007)
[5] Mulcahy et al. (2010)
[6] Müller (2004)

Table 4. Parenting stress, maternal attachment and psychosocial variables: Spearman's Rho Correlations and Descriptive Statistics (N=83)

Variable	1	2	3	4	5	6
1. PSI	-					
2. MAI	-.549**	-				
3. PHQ9	.499**	-.338**	-			
4. GAD7	.511**	-.331**	.862**	-		
5. GSE	-.360**	.171	-624**	-.566**	-	
6. SS	-369**	.274*	-.469**	-.410**	.349**	-
Mean	80.74	97.59	8.97	9.10	28.37	74.21
SD	21.34	11.71	7.48	7.10	6.35	17.40
Range	40-137	26-104	0-27	0-21	12-40	28-95

Note: PSI = Parenting Stress; MAI = Maternal Attachment; PHQ-DAS –Depression and Anxiety; GSE = global self-efficacy; SS = Social Support *p<.05. **p<.001

A linear multiple regression was run to predict parenting stress from depression, anxiety, social support and self-efficacy. The model statistically significantly predicted parenting stress, $F(4, 78), = 8.72$, $p<.0005$, adj $R^2 = 27.4\%$. Only anxiety added statistically significantly to the prediction, $p<.05$. Regression coefficients and standard errors can be found in Table 5 (below).

Table 5: Summary of regression analysis for Parenting Stress

Variable	B	SEβ	β
Parenting Stress	100.96	17.73	
Depression	-.07	.57	-.02
Anxiety	1.12	.56	.37*
Self-efficacy	-.67	.42	-.20
Social Support	-.14	.13	-.12

Note. * p<.05; B = unstandardized regression coefficient; SEβ = standard error of the coefficient; β = standardised coefficient

A second linear multiple regression analysis was run to predict maternal affectionate attachment from depression, anxiety, and social support. The model statistically significantly predicted maternal affectionate attachment $F(3, 79) = 4.10$, $p<.05$, adj $R^2 = 10.2\%$. Only anxiety added a statistically significant unique contribution to the equation $p<.05$. Regression coefficient and standard errors can be found in Table 6 (below).

Table 6: Summary of regression analysis for Maternal Attachment

Variable	B	SEβ	β
Maternal Attachment	100.62	5.18	
Depression	-50	.24	-.43
Anxiety	.11	.25	.09*
Social Support	-0.15	.06	-0.3

Note. * p<.05; B = unstandardized regression coefficient; SEβ = standard error of the coefficient; β = standardised coefficient

4. DISCUSSION

The data presented here indicate an important association between HG pregnancy and its influence on levels of parenting stress and maternal affectionate attachment up to two years' postpartum. In this study women were found to have significantly high levels of parenting stress when compared to women with pre-term infants, and healthy perinatal women; leading to an acceptance of H1. Women with HG were found to have higher levels of maternal affectionate attachment to their infant when compared to healthy perinatal women and women with postnatal depression. This is a rejection of H2. In line with H3, when predicting levels of parenting stress, anxiety, depression, self-efficacy and social support were found to account for 27.4% of the variance, a medium sized effect. Anxiety, depression and social support were found to predict

10.2% of the variance in maternal affectionate attachment, a small effect size. This leads to a rejection of H4, as self-efficacy was not strongly associated with maternal attachment in this sample.

The high levels of parenting stress observed in the sample may be related to emerging research which reports mothers who experience high levels of stress or anxiety in pregnancy are also more susceptible to parenting stress (Huizink et al., 2017). The experience of having a debilitating condition such as HG in pregnancy may render the mother to be unable to access the psychological resources needed to prepare and cope with the transition to motherhood and develop maternal role attainment (Huizink et al., 2017; Webster-Stratton, 1998; Whiffen & Gotlib, 1989). A meta-analysis of women with HG found significantly higher levels of anxiety and depression in women compared to control groups (Mitchell-Jones et al., 2017). A 2018 meta-analysis of women with HG reported themes of isolation; financial impact of loss of earnings; negative psychological effects and an inability to care for self and others resulting in a change of role (Dean, Brannigan & Marsden, 2018). The sequelae of a HG pregnancy does not lend itself well to preparing for parenthood; rather the pregnancy is spent surviving, leaving the mother unable to achieve the usual markers for maternal role attainment. Per Mercer and Ferketich (1994), differences in the achievement of maternal role competence, which is suggested to be associated with parenting stress, would be expected in situations involving high risk pregnancy.

The findings of this study are in line with others whom have found parenting stress to be associated with elevated levels of anxiety and depression (Anding et al., 2016; Sakkolou et al., 2018; Yim et al., 2015); lower self-efficacy (Treat et al., 2019; Raikes & Thompson, 2005); and lower levels of social support (Huang et al., 2019; Pinquart, 2017). Other research reports similar findings, albeit with a decrease in scores from

the third to sixth month after birth (Don & Mickelson, 2012; Figueirdo & Conde, 2011; Vismara et al., 2016). For the current sample, other factors may be influential in the stabilisation of elevated scores. Per McCormack et al. (2011), higher levels of anxiety and depression were observed in a HG sample even after symptoms of HG had resolved. This finding is reflected in the current sample, with over 40% of women meeting clinical cut offs for anxiety and depression. One hypothesis may be that the role of parenthood equating increased responsibility and reduced mobility, paired with the adverse experience of pregnancy, isolation, and financial stress may influence levels of anxiety, depression and parenting stress. A further observation of the current study was that women with HG have more adverse reactions to vomit, this was also noted in the study by Dean et al. (2018). A possible hypothesis could be that normal infant behaviours such as vomiting may increase levels of parenting stress, and mental health difficulties, especially if there is a clinical presentation of emetophobia. This hypothesis warrants future investigation.

Despite the high levels of parenting stress, mothers with HG were found to have high levels of maternal affectionate attachment. This result is in line with those of McCormack et al. (2011), who found that while MFA was lower in women with HG early in pregnancy, by the time HG symptoms resolved, levels of MFA were the same as healthy controls. This finding further negates psychodynamic theory regarding HG being linked to the rejection of the foetus or womanhood (Munch, 2002). This is an important finding as research reports how women with HG, in the absence of a refined aetiology, often feel stigmatised and isolated by services and society, and may well subsequently internalise guilt and responsibility for potential negative impacts on the infant (Dean et al., 2018).

Self-efficacy was not found to be associated with maternal attachment. Research suggests parental self-efficacy is affected by factors including depression, anxiety, and social support (Davis et al., 2003; Leahy-Warren, McCarthy & Corcoran, 2012). It is hypothesised that the general measure used to understand self-efficacy in this group was not sensitive enough to the parenting and postnatal environment. However, characteristics of the sample including self-selection to participate in the survey and maintaining links with HG social support via online communities is suggestive of a level self-efficacy through engagement in health promoting behaviours.

Strengths and limitations

This is the first study the authors are aware of to examine maternal attachment and parenting stress in a HG sample. Limitations of the study include the use of a cross-sectional design and the lack of control group. Cross-sectional research is limited by its lack of generalisability to other time points and populations. This study used an online method for data collection. While internet data collection is more efficient and effective in locating unique populations, it is also subject to self-desirability reporting bias. Data collection was diverse and included many arms of research. The lengthy nature of the survey may have attributed to attrition, resulting in a complete sample of 83. This study was underpowered, which may have led to a Type 11 error. However, as this study is the first of its kind, and there are no other studies upon which to base power calculations, this is an unfortunate consequence of the research infancy.

Implications for future research

The rates of parenting stress observed in this sample recommends further investigation in larger samples. This would be enhanced by using prospective longitudinal designs following women at important clinical points during pregnancy, and the postnatal period. Given the impact of a HG pregnancy on the mother and the wider family, combined with the importance of social support in the buffering of parental stress, taking partner perspective into consideration would also be helpful. If the mother and her partner are both likely to be vulnerable to mental health difficulties, then devising and delivering systemic support would be prudent and beneficial. Future research is also warranted in examining parenting self-efficacy on maternal attachment; and the potential influence of emetophobia on parenting stress and maternal wellbeing following a HG pregnancy. It would be helpful to examine its contribution and direction in parenting stress.

Summary and Conclusion

This study found that women with HG have higher than average maternal affectionate attachment as compared to age matched clinical samples. This finding suggests positive physical, cognitive and emotional outcomes for the child and enhanced wellbeing for the mother. However, this sample was also observed to experience significantly high levels of parenting stress, when compared to mothers with pre-term infants and healthy postnatal mothers who have children older than two. Alternative unique factors may account for stable parenting stress scores in women with HG. This warrants future research.

Declaration of interest

The authors report no declarations of interest. The authors alone are responsible for the content and writing of the paper.

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Critical Evaluation

Word count: 4,839

Introduction

This paper is a critical evaluation and reflection on the first two papers of this thesis and the research process. It includes discussion concerning the strengths and weaknesses of both papers; the broad methodological approach used and consideration of alternative methodologies; rationale for decisions made; and implications for theory, practise and future research. The first two parts of this thesis were:

(1) The association between pregnancy complications and maternal-fetal attachment in the perinatal period: A Systematic Review
(2) Reviewing the impact of Hyperemesis Gravidarum on mother-child attachment and parenting stress up to two years' post-partum: a cross-sectional study.

Topic Selection and Context

My original topic selection began on a different area, albeit with an attachment focus in mind. I selected a study aimed at investigating the feasibility of training practitioners in the use of Theraplay. Funding for this project fell through six months into the research process. Whilst this was a disappointment at the time due to the work I had put in, I understand that funding priorities can change rapidly, and without investment money or grants, many research studies do not get off the ground. Consequently, I was left to find a new study. My supervisor introduced me to the current study on

Hyperemesis Gravidarum (HG), which was already underway with one of my colleagues. Indeed, the present study is one arm of several emerging studies from Cardiff University. My prior knowledge in this area was limited to what is in the public domain, i.e. The Duchess of Cambridge and her struggle with HG. Initially, I was struck by the emerging literature base within this domain from a clinical perspective; soon after I was drawn to the saddening yet empowering personal accounts of HG survivors from content on social media, and my interest grew.

After joining Helen and Cerith, we spoke about developing the study protocol. I had a choice to extend my colleagues research by examining a cognitive model of Hyperemesis Gravidarum in relation to Emetophobia, or to branch off and examine maternal attachment. Whilst the HG research base is in its infancy, understanding the impact of HG on maternal fetal attachment drew my attention. As a scientist-practitioner, I have an interest in working from an attachment-informed, systemic perspective. Working with attachment in mind is of relevance to service provision within the National Health Services (NHS), and key in in providing patient centred care. Therefore, understanding the potential impact of pregnancy complication on mother's attachment and other psychosocial variables known to impact mother and child, such as parenting stress, is integral when developing strategies for care and treatment. Thus, I focussed my study on reviewing the impact of HG on maternal-fetal attachment and parenting stress in the postnatal period.

My natural inclination is to work in an attachment informed, systemic way. The pull to focus on maternal attachment was close to my heart. I was very well supported by my supervisors and colleagues throughout this process and I am thankful to them in providing me with the opportunity to learn about pregnancy complication, HG, and the perinatal field. It has ignited my interest in this field and one that I hope to continue

post D.ClinPsy training. Furthermore, I hope that findings from the current study will inform future research into HG, pregnancy complication and further develop prudent interventions to support women with HG during pregnancy and in the postnatal period.

Rationale, strengths and weaknesses of the thesis

This thesis focused on the effect of pregnancy complication on maternal fetal attachment (MFA), with particular attention in the second paper on Hyperemesis Gravidarum, maternal fetal attachment and parenting stress. Evidence suggests these factors are linked to long-term difficulty for mother and infant, including poorer maternal mental health and less optimal child development (Fejzo et al., 2016; McCormack et al., 2011; Poursharif et al, 2008). However, most research has been developed with women who have low risk or otherwise healthy pregnancies. Therefore, a paucity of research has been developed with women with HG and pregnancy complication. Equivocally, little is known about how pregnancy complication and HG can impact systemically on paternal wellbeing and paternal attachment. Whilst extending the research to consider paternal factors was not an aim of the review, it is one that was observed to be discussed in relation to maternal fetal attachment, and so is included in the discussion of Paper One. Given the critical importance of attachment and parenting stress systemically, this thesis aims to bolster the evidence related to these under researched populations.

Rationale for Empirical Paper

Hyperemesis Gravidarum, a complication of pregnancy and extreme form of nausea and vomiting in pregnancy (NVP) is thought to impact from 0.3-3% of pregnancies (London et al., 2017). The research base is still in its infancy, but some studies have shown that the impact of HG can be far reaching and include: maternal mental health difficulties, social isolation, impact to career and finances, and family planning decisions including the decision to undergo therapeutic termination or sterilisation (Poursharif et al., 2008; Dean et al., 2018). Yet, the aetiology of this condition is elusive. A consideration of the existing research reveals a population of women who feel very misunderstood by the social sciences and healthcare fields. These women are privy to the same challenges of pregnancy and parenthood, whilst also navigating and surviving the added difficulty of extreme pregnancy sickness. Indeed, the impact of HG can out last the pregnancy and result in increased levels of anxiety and depression rendering the HG survivor to be 'physically exhausted and emotionally overwhelmed' (Poursharif et al., 2008, p. 180). For these women, little is known about the after effects of HG on critical factors including maternal attachment and parenting stress. As such, the rationale for this study was to explore maternal attachment and parenting stress in women following HG pregnancy up to two years postpartum. It is hoped the results of this study will help to develop targeted interventions to support women in a prudent and effective way.

Strengths and weaknesses of the Empirical Paper

Strengths

Novel

Prior to this thesis, no quantitative empirical paper has focussed on maternal affectionate attachment and parenting stress in women whom have experienced a HG pregnancy. Therefore, this empirical paper is novel and timely, addressed a gap in the literature and is likely to be publishable.

Use of Patient and Public Involvement (PPI)

Patient and public involvement (PPI) in research is recognised as best practice (Absolom et al., 2015) as it supports the endeavour of ensuring research is meaningful and applicable to those it is based on. This study was developed with support from women who have personal experience of Hyperemesis Gravidarum and those who work to deliver the Pregnancy Sickness Support (PSS) charity support services. The input from women with lived experience of HG was a strength when developing relevant research questions, pilot testing the survey, and planning the dissemination of research findings. Working with PSS was thoroughly beneficial in tailoring the research toward the needs of HG survivors and their families.

The use of PPI also has its challenges. When considering the sensitive nature of maternal attachment given the context and range of women's experiences, we worked hard to ensure we approached this domain in a respectful and gentle manner. However, at times some women felt offended by the nature and wording of standardised scales. Whilst an explanation of the rationale for use of standardised measures was effective, paired with some word changes where appropriate; this did slow the process of data collection down.

Weaknesses

Implementation of data collection method

Due to my relative inexperience in developing and conducting primary research, with hindsight the process of data collection could have been improved. A large attrition rate was observed in the study. However, research does suggest that in internet mediated research participant drop-out is a function of survey length (Hoerger, 2010). Results indicate that 10% of participants drop out instantaneously, with a further 2% dropping out per 100 survey items. This survey was lengthy, taking approximately 45 minutes to complete. As such, participant drop out is likely to have been associated with study length. Additionally, the survey did not use 'forced choice', this led to data omissions and incomplete response by participants. However, implementing 'forced choice' responses has been found to increase dropout rates and decrease the quality of participant answers (Decieux et al. 2015). In retrospect, I would suggest maintaining a balance of forced choice responses for essential questions paired with free choice for response omission. If I had implemented this strategy alongside an explanation for use of forced choice, the effect of large omission rates may have been alleviated.

Internet mediated technology

A limitation of the work carried out relates to the reliance on computer assisted data collection and automation to SPSS. While the benefits of using internet assisted data collection technology outweigh the negatives (i.e. cost and time effective, no geographical limitations, access to a large population pool easy to administer; etc.). When dealing with a large data set, I found it difficult and time consuming rectifying errors when data was automated from a survey platform to SPSS. Furthermore, some

survey variables displayed on Qualtrics used a sliding bar to represent amount. This feature worked well on laptops and some handheld devices, but not others. Unfortunately, this was not picked up in pilot testing. This was fedback to the research team and upcoming studies were able to remove this feature from their surveys and avoid data collection difficulties.

Sampling Bias

A further limitation concerns uncertainty over the validity of the data due to sampling bias. The survey was advertised on social media platforms relating to pregnancy sickness support. Those who viewed the survey are likely to be more motivated and engaged in help seeking behaviours. Participation was voluntary and may not have been as accessible to women who may not have the resource or support to take the time out from their day to volunteer. As such, sampling may have been skewed in favour of those whom are motivated and already engaged in help seeking behaviours.

Culture and Socioeconomic status (SES)

The majority of the sample were earning above the average living wage, and university educated. This somewhat limits the generalisability of findings to the population sample studied. The term ‘hard to reach’ may define different pockets of ethnic minorities and migrants to whom English language difficulties may make access to services and support platforms inaccessible and irrelevant (Bemis Scotland, 2015). Promoting the engagement of ethnic minorities could have been enhanced by advertising the study in varying places of worship, community groups for teenage mothers, and targeting community groups specialising in the support of ethnic minorities. Whilst hosting the study on an online platform enables access to a wider

range of ethnic diversity, more targeted sharing of the survey could have promoted a broader representation of ethnicity in the final sample. Lack of ethnic diversity has been observed elsewhere and may be reflective of the paucity of international studies dedicated to HG (Dean, Bannigan & Marsden, 2018).

What was not studied – Participant feedback

Participants who expressed feedback at the end of the study shared similar concerns. For some women, the impact of HG on current experience of vomit phobia can be quite debilitating. The link between HG and emetophobia warrants further research. Other women expressed an interest in being able to discuss the psychosocial impact of HG on current experience, this may include financial impact, guilt, isolation, frustration at health care services. A study, similar to Poursharif et al. (2009), may be warranted to capture an up to date view of psychosocial subjective experiences of HG.

Critique of the broad methodological approach used: Empirical Paper

Diversity

The current study was dominated by British and Irish women, from higher than average socioeconomic status. The lack of diversity observed in this study is representative of the wider HG evidence base. Under-representation of populations such as ethnic and migrant minorities, and people living in deprived socio-economic areas is a concern. Migrant and ethnic minority groups comprise substantial parts of European populations, and frequently experience health disadvantages due to language barriers or socio-economic inequality (Grosser et al. 2016). The low rate of participation from minority groups reduces the generalisability of the findings. On a wider scale, it can lead to further widening of health inequalities (Waheed et al., 2003).

Measures employed

A battery of measures was used in this study. Data was collected on maternal attachment, parenting stress, depression, anxiety, social support and self-efficacy. The rationale for collecting data on these outcomes was linked to findings from the literature base. NICE (2018) recommends use of the PHQ9 and GAD7 with women in the prenatal and postnatal period. However, many research studies have employed the Edinburgh Postnatal Depression Scale to measure depression, also recommended by NICE. The decision to include the PHQ9 instead of the EPDS was linked to findings from the research base which found it to be highly specific in identifying postpartum depression in women (Gjerdingen et al., 2009); furthermore, it can be used as a composite scale of anxiety and depression when used with the GAD7. A global measure of self-efficacy was chosen for the survey. In hindsight, this was a limitation and should have been replaced with a specific parenting self-efficacy measure. A parenting self-efficacy measure may have been more sensitive to the difficulties faced with mothers in the postnatal period.

One of the scales employed was not freely available. In order to use the scale, I had to apply for a licence and pay for each use of the scale. This was a very costly and time consuming procedure. Furthermore, as per the licence agreement I had certain agreements to fulfil which took considerable effort and planning to fulfil (i.e. password protecting the survey). Paying per use for clinical instruments strikes an interesting debate about whether this creates a two-tiered system for clinicians and researchers alike. For example, does the use of licenced measures only mean they are available to wealthier institutions? In an economy focussed on savings, this scale could certainly not be practical for use within the NHS. Given my experience, I would

be reticent against using a measure that is not freely available for use in the public domain.

Diagnostic criteria of HG

In the absence of unified criteria for diagnosing HG, there was no valid way to retrospectively quantify whether women in this study experienced HG, or to discriminate it from NVP. Varying approaches to treatment for HG, including prescription of antiemetic medication and hospitalisation for intravenous fluids, paired with varying subjective and objective experiences of women treatment for HG make this difficult to measure. As per Dean et al. (2018), by including women with a range of experiences, studies can highlight possible negative effects that can occur for women across the spectrum.

Study design

Cross-sectional research has an important place in the evidence base as it allows the research to determine prevalence, in an effective way. It also allows access to groups with certain conditions, such as HG. However, it cannot differentiate cause and effect from association. A weakness of using this design was the absence of a case control group. Future research would benefit from longitudinal research designs following women from early pregnancy through the postnatal period, conducting assessment at varying intervals.

While it was my intention to follow up participants at time two, an error in using Qualtrics meant that participants who had agreed to be followed up could not be contacted due to the anonymity embedded into the creation of the survey. This was a

very disappointing, but also valuable opportunity to reflect on the intricacies of research design, confidentiality and anonymity when using internet assisted platforms.

Limitations of the line of enquiry

This study employed a hypothetic-deductive approach to explore the hypotheses: H1: Parenting stress levels will be higher in women with HG when compared to age matched clinical and non-clinical samples; H2: Maternal affectionate attachment will be lower in women with HG when compared to age matched clinical and non-clinical samples; H3: Parenting stress will be predicted by elevated anxiety, depression and lower levels of self-efficacy and social support; H4: Maternal attachment will be predicted by lower levels of anxiety and depression, higher self-efficacy and social support. The first and third hypotheses were accepted and the second and fourth rejected. As this area of research is in its infancy, I was not able to compare my findings against those of other publications. As such, it would also have been helpful to use an inductive approach to generate theory from the data. This limitation is realised upon comparison of findings from the qualitative literature as compared to the quantitative literature.

Rationale for Systematic Review

Pregnancy complication is reported to impact up to 20% of pregnancies and is a leading cause of neonatal death (World Health Organisation, 2018). Women who experience pregnancy complication are reported to experience increased stress levels and poorer mental wellbeing; the effects of which can be long lasting (Henderson, Carson & Redshaw, 2016). However, women with pregnancy related conditions are often excluded from the research base resulting in a paucity of studies. Furthermore,

while the evidence is clear regarding the importance of maternal fetal attachment (MFA) in the prenatal period on postnatal outcomes for mother and child (Branjerdporn et al., 2017), much less is known about this in women with pregnancy complication. As such, the rationale for this review was to systematically appraise the evidence base, and to bring to light current knowledge concerning these domains. It is hoped that the systematic review will shed light on implications for theory, future research and clinical practise.

Strengths and weaknesses of the Systematic Review

Strengths

Novel

Prior to this thesis, to my knowledge, no review has been conducted that specifically focussed on pregnancy complications and maternal-fetal attachment in the perinatal period. As such, this systematic review (SR) is novel and timely, addressed a gap in the literature and is likely to be publishable.

Geographical representation

This review represented research from a geographical range including studies from the US, Ireland, Egypt, Italy and Turkey. It also represented women from an inner city low socio-economic (SES) population (Chazotte, et al., 1995). Issues concerning ethnic diversity will be discussed below.

Collaboration with Professionals

The search strategy was created in collaboration with a University Librarian, specialising in Psychological methods and research. Authors with relevant

publications in the field were contacted regarding unpublished research or any publication in press.

Reporting Protocol

The PRISMA guidelines (Moher, Liberati, Tetzlaff & Altman, 2009) were followed for conducting this systematic review. Key aspects of this review are recorded in the international database of prospectively registered systematic reviews PROSPERO by the Centre for Reviews and Dissemination, New York (CRD42019130377), which can be accessed at: https://www.crd.york.ac.uk/prospero/.

Weaknesses

The novice researcher

Prior to the present study I have not had the experience of undertaking a systemic review. As such, my inexperience may have limited the credibility of the study, partially in relation to data extraction and quality appraisal. For example, a systematic review by Jones et al. (2005), found that the amount of reporting errors increased when researcher experience decreased. However, subsequent analysis showed that these errors did not affect the conclusions of the review. Conversely, Horton et al. (2010) report that researchers level of experience does not equate reporting accuracy. Rather, systems promoting mastery were suggested as moderators. As such, to alleviate potential for inexperience to limit the validity and reliability of the study, the Preferred Reporting Items for Systematic Reviews and Meta- Analyses (PRISMA) guidelines were followed. The author was also supervised by experienced researchers who have knowledge of the subject area and perinatal mental health.

Older research

The majority of studies reviewed are quite dated, which reflects a lack of recent and high quality research into the domain of pregnancy complication and MFA. Poor quality and older research, using a variety of constructs to measure MFA is a limitation. The main difficulties with this include differences in risk measuring indices used to define and diagnose pregnancy complication. For example, ICD-10 criteria used in some studies was endorsed in 1990, after others had been published. However, owing to the paucity of studies on this subject, all studies that met inclusion criteria were accepted regardless of age.

Critique of the broad methodological approach

Quality appraisal and risk of bias

The evaluation of the methodological quality of original research in a review is integral to guarantee the validity and reliability of results (Jarde, Losilla, Vives, 2012). However, with a plethora of tools available for use, there is no agreement on which tool should be used when considering observational study designs. The current study selected the quality appraisal of observational, cohort and cross-sectional studies (National Institute of Health, National Heart, Lung and Blood (NIH NHLBI) Quality Assessment Tool for Observational, Cohort and Cross-Sectional Studies; see Appendix E). This tool was selected as it fit the recommendations outlined in a recent systematic review by Mueller et al. (2018). For example, the NIH tool uses a component approach guided by the domains of bias most relevant to the eligible studies. Most studies in the review recommended against the use of a scale. A review of the evidence base does not yield any further guidance as this field is in its infancy and therefore cannot recommend a tool. Other reviewers conducting research on MFA

in healthy populations used a bespoke tool (Göbel et al., 2018). While the author did consider this, the adaption of a bespoke tool was lengthy (20-items) and therefore did not fit in with recommendations by Mueller (2018).

Publication Bias

The search strategy limited results to peer reviewed primary research and excluded grey literature (Doctorate, Masters and Bachelors dissertations, book chapters and other unpublished sources). A 2012 database survey reported that analyses of individual participant data should ideally be informed by a rigorous systematic review that searches for both published and unpublished studies (Ahmed, Sutton & Riley, 2012). To ameliorate the absence of grey literature from the current review, a scoping exercise was performed to aid understanding of results within this domain. Due to the time consideration in accessing abstracts and full dissertations, the scoping review was limited. Of the two doctoral dissertations, I could access, results suggested no significant differences between mothers hospitalised for obstetric risk (Brandon, 2006), and suggested that the quality of a woman's relationship with her partner influences maternal fetal attachment. These findings reflect the nature of findings from the current review (Rifkin, 2007). Further information of this scoping exercise can be found in Appendix H.

Sampling Bias

Most studies in this review were conducted in hospital settings. This may bias the research in favour of women who were referred for treatment of pregnancy complication; whereas in the absence of diagnostic criteria for older studies, many women with pregnancy related illness may not have been referred to hospital. The experience of being hospitalised may represent the perception of being taken

seriously and looked after, positively influencing the attachment process and maternal wellbeing. Indeed, for some women hospital presented an opportunity to enhance maternal attachment behaviours through regular fetal monitoring. Conversely, hospitalisation can result in further stress for others who have concerns regarding childcare and financial implications from loss of work (Pisoni et la., 2015). However, convenience sampling was used in most cases which can somewhat reduce external validity.

Search criteria

In the absence of a unified definition of pregnancy related illness, the author had to refine current criteria using ICD-10 classification and guidelines from the Centre for Disease Control and Prevention (CDC; accessed at https://www.cdc.gov/reproductivehealth/pregnancy-complications.html), and a review of the literature base. This refined the population group to women with hypertensive disorders of pregnancy (high blood pressure, preeclampsia, gestational hypertension, HELLP syndrome, acute fatty liver of pregnancy), hyperemesis gravidarum, nausea and vomiting (NVP), gestational diabetes mellitus, pregnancy related anaemia, pelvic girdle pain, pre-term labour, placenta previa, premature rupture of membrane (PROM), placental abruption, intrauterine bleeding, pre-term labour. However other factors which may complicate a pregnancy or make it 'high risk' (fetal anomaly, risky health behaviours, pre-existing mental health difficulty) were excluded. The lack of uniform diagnostic criteria for this subgroup within the literature base may allow substantial heterogeneity and weaken comparability across studies.

Implications for theory and future research

More research is needed to understand possible mechanisms explaining the observed high levels of parenting stress in women with HG. This paper suggests that anxiety, depression, social support, and self-efficacy are predictive of parenting stress, but this model only accounts for 27.4% of the variance. Other factors may contribute a better understanding. The findings from this paper suggest exploring the impact of emetophobia and generating more extensive research into the impact of pregnancy complication on fathers/partners. This is related to the evidence which suggests spousal support to be significantly associated in maternal wellbeing and maternal attachment to infant. Heterogeneity of samples is also problematic; more diversity of samples is required to generalise these findings to women of non-Western ethnicity. A lack of definition around pregnancy complication and diagnostic criteria for HG is problematic in research. Employing singular constructs to measure attachment domains would be most useful for future systematic reviews and meta-analyses.

Implications for practice

Prenatal interventions

The overall findings of this paper suggest that MFA in women who experienced pregnancy complication is a complex issue. Results of the review suggest the importance of providing the prospective mother with psychoeducation concerning the type of illness she is experiencing and to spend time understanding how the mother perceives that risk. Mothers perception of risk may be quite different to an objective medical appraisal of risk. Any misconceptions should be corrected, with the appropriate psychoeducation offered. Further psychoeducation can be offered on how to cope with the stresses and distress associated with a pregnancy illness and

information offered on positive approval coping methods. Additionally, the results suggest evaluating the mother and father/partner together, as the attachment of both caregivers to the unborn baby may be important for the joint wellbeing of the couple, attachment and consequently child development.

Postnatal interventions

For women with HG, one of the most important findings is the need for understanding, empathy and validation. Quite often in healthcare systems the mother may be well looked after physically, but her psychologically and emotional needs may not be considered. This may have a profound impact on prenatal levels of distress and postnatal levels of parenting stress. It may be pertinent to consider the impact of emetophobia and to think about systemic impacts of the pregnancy complication on partners and other children. Very practical supports such as having child care facilities in place to allow the parents an opportunity to attend parenting classes may be prudent. Furthermore, parenting classes have been shown to increase parental self-efficacy, enhance attachment and lower levels of parenting stress (Benedetto & Ingrassia, 2017).

Dissemination

The first two papers of this thesis will be submitted to the British Journal of Health Psychology. This journal was chosen for its wide readership and applicability across healthcare specialities. It is important that the women who contributed to this research get an unbiased and clear version of the findings. As such, the findings will be shared through the development of a podcast and shared amongst the communities who

supported data collection (pregnancy sickness support). The empirical paper will be submitted to the Hyperemesis Gravidarum Annual Conference in October 2019. I will also look for further opportunities to present and share these findings where appropriate.

I am aware of the balance between getting the findings of thesis into the public domain whilst managing the sensitive nature of that message. I will use supervision and close consultation with PSS who have experience with this domain, as well as Cardiff University press/media service to help me achieve this aim knowing the challenges this may bring.

Supervision

Regular supervision has been integral to my growth as a scientist-practitioner. It has been a space to share ideas and concerns, whilst also learning through the advice and lived experience of my supervisors. Supervision has helped me to form my ideas about how to conduct research, manage difficulties professionally and to embrace the unknown. It has also supported me in the development of skills in data collection, data analysis and research methodology. I am thankful to Helen and Cerith for supporting me throughout this process and never allowing me to feel any less than empathised with during the most challenging points.

Personal Reflections

Undertaking this thesis has been a challenging but enjoyable experience. I have made mistakes, set myself back, but learned through it all. I have benefitted from being a part of a knowledgeable, supportive and passionate research team. Through my supervisors I have learned how to manage the balance between being a clinician

and researcher within the NHS. I have also enjoyed the opportunity to work alongside the community of women from pregnancy sickness support in the creation of this research. Furthermore, I have internalised skills which I will bring with me into clinical practice and future research project

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Appendix A: British Journal of Health Psychology Author Submission guidelines

1. SUBMISSION

Authors should kindly note that submission implies that the content has not been published or submitted for publication elsewhere except as a brief abstract in the proceedings of a scientific meeting or symposium.

Once the submission materials have been prepared in accordance with the Author Guidelines, manuscripts should be submitted online at http://www.editorialmanager.com/bjhp

Click here for more details on how to use **Editorial Manager**.

All papers published in the *British Journal of Health Psychology* are eligible for Panel A: Psychology, Psychiatry and Neuroscience in the Research Excellence Framework (REF).

Data protection:

By submitting a manuscript to or reviewing for this publication, your name, email address, and affiliation, and other contact details the publication might require, will be used for the regular operations of the publication, including, when necessary, sharing with the publisher (Wiley) and partners for production and publication. The publication and the publisher recognize the importance of protecting the personal information collected from users in the operation of these services, and have practices in place to ensure that steps are taken to maintain the security, integrity, and privacy of the personal data collected and processed. You can learn more at **https://authorservices.wiley.com/statements/data-protection-policy.html**.

Preprint policy:

This journal will consider for review articles previously available as preprints on non-commercial servers such as ArXiv, bioRxiv, psyArXiv, SocArXiv, engrXiv, etc. Authors may also post the submitted version of a manuscript to non-commercial servers at any time. Authors are requested to update any pre-publication versions with a link to the final published article.

2. AIMS AND SCOPE

The British Journal of Health Psychology publishes original research on all aspects of psychology related to health, health-related behaviour and illness across the lifespan including:

- experimental and clinical research on aetiology
- management of acute and chronic illness
- responses to ill-health
- screening and medical procedures

- psychosocial mediators of health-related behaviours
- influence of emotion on health and health-related behaviours
- psychosocial processes relevant to disease outcomes
- psychological interventions in health and disease
- emotional and behavioural responses to ill health, screening and medical procedures
- psychological aspects of prevention

3. MANUSCRIPT CATEGORIES AND REQUIREMENTS

The types of paper invited are:

- papers reporting original empirical investigations, using either quantitative or qualitative methods, including reports of interventions in clinical and non-clinical populations;
- theoretical papers which report analyses on established theories in health psychology;
- we particularly welcome review papers, which should aim to provide systematic overviews, evaluations and interpretations of research in a given field of health psychology (narrative reviews will only be considered for editorials or important theoretical discourses); and
- methodological papers dealing with methodological issues of particular relevance to health psychology.

Authors who are interested in submitting papers that do not fit into these categories are advised to contact the editors who would be very happy to discuss the potential submission.

Papers describing quantitative research (including reviews with quantitative analyses) should be no more than 5000 words (excluding the abstract, reference list, tables and figures). Papers describing qualitative research (including reviews with qualitative analyses) should be no more than 6000 words (including quotes, whether in the text or in tables, but excluding the abstract, tables, figures and references). In exceptional cases the Editor retains discretion to publish papers beyond this length where the clear and concise expression of the scientific content requires greater length (e.g., explanation of a new theory or a substantially new method). Authors must contact the Editor prior to submission in such a case.

All systematic reviews must be pre-registered.

Please refer to the separate guidelines for **Registered Reports**.

4. PREPARING THE SUBMISSION

Contributions must be typed in double spacing. All sheets must be numbered.

Cover Letters

Cover letters are not mandatory; however, they may be supplied at the author's discretion. They should be pasted into the 'Comments' box in Editorial Manager.

Parts of the Manuscript

The manuscript should be submitted in separate files: title page; statement of contribution; main text file; figures/tables; supporting information.

Title Page

You may like to use **this template** for your title page. The title page should contain**:**

- A short informative title containing the major key words. The title should not contain abbreviations (see Wiley's best practice SEO tips);
- A short running title of less than 40 characters;
- The full names of the authors;
- The author's institutional affiliations where the work was conducted, with a footnote for the author's present address if different from where the work was conducted;
- Abstract;
- Keywords;
- Acknowledgments.

Authorship

Please refer to the journal's Authorship policy in the Editorial Policies and Ethical Considerations section for details on author listing eligibility. When entering the author names into Editorial Manager, the corresponding author will be asked to provide a CRediT contributor role to classify the role that each author played in creating the manuscript. Please see the **Project CRediT** website for a list of roles.

Abstract

For articles containing original scientific research, a structured abstract of up to 250 words should be included with the headings: Objectives, Design, Methods, Results, Conclusions. Review articles should use these headings: Purpose, Methods, Results, Conclusions. As the abstract is often the most widely visible part of your paper, it is important that it conveys succinctly all the most important features of your study. You can save words by writing short, direct sentences. Helpful hints about writing the conclusions to abstracts can be found **here**.

Keywords

Please provide appropriate keywords.

Acknowledgments

Contributions from anyone who does not meet the criteria for authorship should be listed, with permission from the contributor, in an Acknowledgments section. Financial and material support should also be mentioned. Thanks to anonymous reviewers are not appropriate.

Statement of Contribution

All authors are required to provide a clear summary of 'what is already known on this subject?' and 'what does this study add?'. Authors should identify existing research knowledge relating to the specific research question and give a summary of the new knowledge added by your study. Under each of these headings, please provide 2-3 (maximum) clear outcome statements (not process statements of what the paper does); the statements for 'what does this study add?' should be presented as bullet points of no more than 100 characters each. The Statement of Contribution should be a separate file.

Main Text File

As papers are double-blind peer reviewed, the main text file should not include any information that might identify the authors.

The main text file should be presented in the following order:

- Title

- Main text
- References
- Tables and figures (each complete with title and footnotes)
- Appendices (if relevant)

Supporting information should be supplied as separate files. Tables and figures can be included at the end of the main document or attached as separate files but they must be mentioned in the text.

- As papers are double-blind peer reviewed, the main text file should not include any information that might identify the authors. Please do not mention the authors' names or affiliations and always refer to any previous work in the third person.
- The journal uses British spelling; however, authors may submit using either option, as spelling of accepted papers is converted during the production process.

References

References should be prepared according to the *Publication Manual of the American Psychological Association* (6th edition). This means in text citations should follow the author-date method whereby the author's last name and the year of publication for the source should appear in the text, for example, (Jones, 1998). The complete reference list should appear alphabetically by name at the end of the paper. Please note that for journal articles, issue numbers are not included unless each issue in the volume begins with page 1, and a DOI should be provided for all references where available.

For more information about APA referencing style, please refer to the **APA FAQ**.

Reference examples follow:

Journal article

Beers, S. R. , & De Bellis, M. D. (2002). Neuropsychological function in children with maltreatment-related posttraumatic stress disorder. *The American Journal of Psychiatry*, *159*, 483–486. doi:**10.1176/appi.ajp.159.3.483**

Book

Bradley-Johnson, S. (1994). *Psychoeducational assessment of students who are visually impaired or blind: Infancy through high school* (2nd ed.). Austin, TX: Pro-ed.

Internet Document

Norton, R. (2006, November 4). How to train a cat to operate a light switch [Video file]. Retrieved from **http://www.youtube.com/watch?v=Vja83KLQXZs**

Tables

Tables should be self-contained and complement, not duplicate, information contained in the text. They should be supplied as editable files, not pasted as images. Legends should be concise but comprehensive – the table, legend, and footnotes must be understandable without reference to the text. All abbreviations must be defined in footnotes. Footnote symbols: †, ‡, §, ¶, should be used (in that order) and *, **, *** should be reserved for P-values. Statistical measures such as SD or SEM should be identified in the headings.

Figures

Although authors are encouraged to send the highest-quality figures possible, for peer-review purposes, a wide variety of formats, sizes, and resolutions are accepted.

Click here for the basic figure requirements for figures submitted with manuscripts for initial peer review, as well as the more detailed post-acceptance figure requirements.

Legends should be concise but comprehensive – the figure and its legend must be understandable without reference to the text. Include definitions of any symbols used and define/explain all abbreviations and units of measurement.

Colour figures. Figures submitted in colour may be reproduced in colour online free of charge. Please note, however, that it is preferable that line figures (e.g. graphs and charts) are supplied in black and white so that they are legible if printed by a reader in black and white. If an author would prefer to have figures printed in colour in hard copies of the journal, a fee will be charged by the Publisher.

Supporting Information

We strongly encourage submission of protocol papers or trial registration documents, where these are in the public domain, to allow reviewers to assess deviations from these protocols. This will result in reviewers being unblinded to author identity.

Supporting information is information that is not essential to the article, but provides greater depth and background. It is hosted online and appears without editing or typesetting. It may include tables, figures, videos, datasets, etc.

Click here for Wiley's FAQs on supporting information.

Note: if data, scripts, or other artefacts used to generate the analyses presented in the paper are available via a publicly available data repository, authors should include a reference to the location of the material within their paper.

General Style Points

For guidelines on editorial style, please consult the **APA Publication Manual** published by the American Psychological Association. The following points provide general advice on formatting and style.

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- **Abbreviations:** In general, terms should not be abbreviated unless they are used repeatedly and the abbreviation is helpful to the reader. Initially, use the word in full, followed by the abbreviation in parentheses. Thereafter use the abbreviation only.
- **Units of measurement:** Measurements should be given in SI or SI-derived units. Visit the Bureau International des Poids et Mesures (BIPM) website for more information about SI units.
- **Effect size:** In normal circumstances, effect size should be incorporated.
- **Numbers:** numbers under 10 are spelt out, except for: measurements with a unit (8mmol/l); age (6 weeks old), or lists with other numbers (11 dogs, 9 cats, 4 gerbils).

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Manuscript Preparation Tips: Wiley has a range of resources for authors preparing manuscripts for submission available **here.** In particular, we encourage authors to consult Wiley's best practice tips on **Writing for Search Engine Optimization**.

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Except where otherwise stated, the journal operates a policy of anonymous (double blind) peer review. Please ensure that any information which may reveal author identity is blinded in your submission, such as institutional affiliations, geographical location or references to unpublished research. We also operate a triage process in which submissions that are out of scope or otherwise inappropriate will be rejected by the editors without external peer review. Before submitting, please read **the terms and conditions of submission** and the **declaration of competing interests**.

The Journal receives a large volume of papers to review each year, and in order to make the process as efficient as possible for authors and editors alike, all papers are initially examined by the Editors to ascertain whether the article is suitable for full peer review. In order to qualify for full review, papers must meet the following criteria:

- the content of the paper falls within the scope of the Journal
- the methods and/or sample size are appropriate for the questions being addressed
- research with student populations is appropriately justified
- the word count is within the stated limit for the Journal (i.e. 5000 words, or 6,000 words for qualitative papers)

We aim to provide authors with a first decision within 90 days of submission.

Further information about the process of peer review and production can be found in '**What happens to my paper?**' Appeals are handled according to the **procedure recommended by COPE**. Wiley's policy on the confidentiality of the review process is **available here**.

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Accurate and complete reporting enables readers to fully appraise research, replicate it, and use it. Authors are encouraged to adhere to recognised research reporting standards. The EQUATOR Network collects more than 370 reporting guidelines for many study types, including for:

- Randomised trials: CONSORT
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We also encourage authors to refer to and follow guidelines from:

- Future of Research Communications and e-Scholarship (FORCE11)
- The Gold Standard Publication Checklist from Hooijmans and colleagues
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Conflict of Interest

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disclosed when directly relevant or directly related to the work that the authors describe in their manuscript. Potential sources of conflict of interest include, but are not limited to: patent or stock ownership, membership of a company board of directors, membership of an advisory board or committee for a company, and consultancy for or receipt of speaker's fees from a company. The existence of a conflict of interest does not preclude publication. If the authors have no conflict of interest to declare, they must also state this at submission. It is the responsibility of the corresponding author to review this policy with all authors and collectively to disclose with the submission ALL pertinent commercial and other relationships.

Funding

Authors should list all funding sources in the Acknowledgments section. Authors are responsible for the accuracy of their funder designation. If in doubt, please check the Open Funder Registry for the correct nomenclature: **https://www.crossref.org/services/funder-registry/**

Authorship

All listed authors should have contributed to the manuscript substantially and have agreed to the final submitted version. Authorship is defined by the criteria set out in the APA Publication Manual:

"Individuals should only take authorship credit for work they have actually performed or to which they have substantially contributed (APA Ethics Code Standard 8.12a, Publication Credit). Authorship encompasses, therefore, not only those who do the actual writing but also those who have made substantial scientific contributions to a study. Substantial professional contributions may include formulating the problem or hypothesis, structuring the experimental design, organizing and conducting the statistical analysis, interpreting the results, or writing a major portion of the paper. Those who so contribute are listed in the byline." (p.18)

Appendix B: PICOS Table

PICOS table	
Review Question	What is the association of pregnancy complication on maternal fetal attachment in the prenatal and postnatal period?

Population	Women whom have experienced a pregnancy induced illness/pregnancy complication, including: hypertensive disorders of pregnancy (high blood pressure, preeclampsia, gestational hypertension, HELLP syndrome, acute fatty liver of pregnancy), deep vein thrombosis, hyperemesis gravidarum, nausea and vomiting, gestational diabetes mellitus, pregnancy related anaemia, pelvic girdle pain, peri-partum cardiomyopathy), thrombosis, pre-term labour, placenta previa, premature rupture of membrane, placental abruption, intrauterine bleeding, pre-term labour
Intervention	N/a
Comparator	Low risk pregnant women/healthy pregnant women, women without pregnancy induced illness
Outcomes	Any impact (positive or negative) on maternal fetal attachment
Study design	All
Setting	All settings: hospitals, antenatal clinics, GP surgeries, outpatient and community settings.

Appendix C: Systematic Review Search Strategy

Database	**Date searches performed**	**Search Terms/Search Strategy (**a mixture of keywords, MESH terms and search strings using

		Boolean operators (AND, OR, NEAR, ADJ3/N3) were applied to each of the database searches)
PsycINFO/OVID	From inception (1806) – March 27th2019	Pregnancy related health condition* Obstetrical complication* Pregnancy complication* Disorder adj3 pregnancy Condition adj3 pregnancy Hypertensive disorder* Hypertensive adj3 pregnancy High blood pressure adj3 pregnancy Gestational diabetes mellitus Preeclampsia Hyperemesis gravidarum Vomiting adj3 pregnancy Nausea adj3 pregnancy Anaemia adj3 pregnancy Anemia adj3pregnancy Pelvic girdle pain Placenta previa Placental abruption AND Maternal fetal attachment Maternal foetal attachment Mother child relation* Mother foetal bond* Mother fetal bond* Prenatal bond*
Medline ®	From inception (1946) – March 27th2019	Pregnancy related health condition* Obstetrical complication* Pregnancy complication* Disorder adj3 pregnancy Condition adj3 pregnancy Hypertensive disorder* Hypertensive adj3 pregnancy High blood pressure adj3 pregnancy Gestational diabetes mellitus Preeclampsia Hyperemesis gravidarum Vomiting adj3 pregnancy Nausea adj3 pregnancy Anaemia adj3 pregnancy Anemia adj3pregnancy Pelvic girdle pain Placenta previa Placental abruption AND Maternal fetal attachment Maternal foetal attachment Mother child relation* Mother foetal bond* Mother fetal bond* Prenatal bond*
Web of Science	From inception (1975) – March 27th2019	Pregnancy NEAR/3 complication* Pregnancy NEAR/3 condition*

		Pregnancy NEAR/3 disorder* (Postnatal or perinatal or post-partum or postpartum) NEAR/3 (condition* or complication* or disorder*) "high risk pregnanc*" (pre-eclampsia or preeclampsia or "gestational diabetes mellitus" or "hypertensive disorder"*) or "anaemia" or anaemia" or "obesity" or "hyperemesis gravidarum" or "preterm labour" or "placenta previa" ((maternal or antenatal or prenatal) NEAR/3 (fetal or foetal or fetus or foetus) NEAR/3 (attach* or bond* or relationship*))
CINAHL	From inception (1937) – March 27th2019	Pregnancy complications/ Pregnancy, high risk/ Pregnancy related illness Pregnancy induced illness Pregnancy related condition Hyperemesis Gravidarum/ Pregnancy induced hypertension/ Labour premature/ AND Prenatal bonding/ Prenatal attachment Maternal fetal attachment Maternal fetal bonding Maternal fetal relationship

Appendix D: Data Extraction Form

Data Extraction Form

ID: first author, year, country	
Full reference	
Reviewer ID (initial)	
Data of review	

Study characteristics

Study Design	
Time: Prenatal, Postnatal	
Study aims	
Type of pregnancy population & sample size	
How was complication defined/measured?	
Comparison group & sample size	
Setting (e.g. hospital, clinic, home)	
Cultural context	
Method of sampling	
Inclusion criteria	
Exclusion criteria	
Power calculation	
Maternal Age (mean, SD, range)	
Maternal age of comparison/control group (mean, SD, range)	
Gestational Age	
Gestational age of comparison/control group	
Ethnicity	
What socio-demographics were recorded?	
What obstetric factors were recorded?	
Time points	
Duration of study: start date, end date	
How was MFA measured?	
Did this study also look at the impact of mental health on attachment?	
How was anxiety measured?	
How was depression measured?	
How did anxiety impact attachment?	
How did depression impact attachment?	
Notes	

Attrition

Drop out/withdrawal	
How was this addressed/report on drop out	

Data analysis

Main statistical procedure & reporting	

Findings

Summary of main findings	
Conflict of interest	
Funding	
Anything else?	

Appendix E: NIH Quality Assessment Tool

Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies

- Study Quality Assessment Tools

Criteria	Yes	No	Other (CD, NR, NA)*
1. Was the research question or objective in this paper clearly stated?			
2. Was the study population clearly specified and defined?			
3. Was the participation rate of eligible persons at least 50%?			
4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?			
5. Was a sample size justification, power description, or variance and effect estimates provided?			
6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?			
7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?			

Criteria	Yes	No	Other (CD, NR, NA)*
8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?			
9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?			
10. Was the exposure(s) assessed more than once over time?			
11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?			
12. Were the outcome assessors blinded to the exposure status of participants?			
13. Was loss to follow-up after baseline 20% or less?			
14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?			

Quality Rating (Good, Fair, or Poor)
Rater #1 initials:

Quality Rating (Good, Fair, or Poor)
Rater #2 initials:
Additional Comments (If POOR, please state why):

*CD, cannot determine; NA, not applicable; NR, not reported

Appendix F: Scales used to measure Maternal Fetal Attachment

Overview of the construct definitions and scoring range for the included instruments assessing prenatal and postnatal bonding		
Instrument	**Construct specifications**	**Scoring range**
Maternal Fetal Attachment Scale (MFAS; Cranley, 1979)	This scale is designed to assess "the extent to which pregnant women engage in behaviours that represent an affiliation and interaction with their unborn child" (Cranley, 1981, p.282). The MFAS is a 24-item questionnaire using a 5-point Likert scale. Subscales: giving of self, role taking, differentiation of self from fetus, attributing characteristics to the fetus, interaction with fetus	MFAS total: 24-120 Subscales: giving of self 5-25 Role-taking: 4-20 Differentiation of self from fetus: 4-20 Attributing characteristics to the fetus: 6-30 Interaction with fetus: 5-25 **Higher scores indicate higher level of attachment**
Maternal Antenatal Attachment Scale (MAAS; Condon, 1993)	This scale is designed to assess "the emotional tie or bond which normally develops between a pregnant woman and her unborn child" (Condon & Corkindale, 1997, p359) Subscales: intensity of preoccupation/time spent in attachment mode, quality of emotional bond to the fetus/emotional proximity	MAAS total: 19-95 Subscales: quality: 11-55 Intensity: 8-40 **Higher scores indicate increased attachment quality/intensity**
Paternal Antenatal Attachment Scale (PAAS; Condon, 1993)	This 16-item scale is designed to assess a fathers' feelings, attitudes and behaviours toward the fetus. Subscales: Quality of attachment (8-items), which refers to the nature of the emotional experience when thinking about the fetus; Intensity of attachment (6-items) which refers to the intensity of preoccupation with the fetus.	PAAS total: 16-80 Subscales: quality: 10-50 Intensity: 6-30 **Higher scores indicate increased attachment quality/intensity**
Paternal Fetal Attachment (PFA; Weaver & Cranley, 1983)	The PFA was adapted from the MFAS (Cranley,1979). This 33-item scale is composed of five subscales that measure different aspects of the parent-fetal relationship. Subscales: differentiation of self from fetus; interaction with the fetus, attributing characteristics	PFA total score: Subscales: giving of self: Role-taking: Differentiation of self from fetus: Attributing characteristics to the fetus: Interaction with fetus:

	and intentions to the fetus, giving of self, role taking.	**Higher scores indicate higher level of attachment**
Prenatal Attachment Inventory (PAI)	This scale is designed to assess the "unique affectionate relationship that develops between a woman and her fetus" (Muller & Mercer, 1993, p201) The PAI is a 21-item questionnaire using a 4-point Likert scale. Themes: affection for the baby, interaction with the baby	PAI total: 21-84 **Higher scores indicate higher level of attachment**
Mother infant rating scale (Hock et al, 1983)	This instrument is designed as a checklist for use during a 15-minute period of observation while the mother is feeding her infant. Categories assessed include: contact with the infant, verbal interaction, visual contact, and response to stimuli	No information available.
The Prenatal Tool (PT)	This scale consists of 39 Likert-type items arranged on a 6-point response scale. Subscales: 'feelings of motherliness' (FOM) which includes 19 questions concerning the pregnant woman's feelings about mothering. The second scale is 'conception of the fetus as a person' (CFP) and includes 20 questions about how a woman feels about the baby inside her (Rees, 1980).	Higher scores indicate greater feelings of motherliness (FOM) and greater prenatal attachment

Appendix G: Parental Stress Index-Short Form-4 Subscales

PSI-SF-4 Scale Descriptions

Scale	Description
Total Stress	Assesses the overall level of parenting stress experienced by the respondent
Parenting Distress (PD)	Assess the level of stress a parent reports as a function of personal factors directly related to parenting,
Parent-Child Dysfunctional Interaction (P-CDI)	Assess the extent to which the parent perceives the child as not meeting expectations and finds that interactions with the child are not reinforcing his or her parenting role.
Difficult Child (DC)	Assess the temperament or behavioural characteristics of the child that influence the parent-child relationship.

Appendix H: Table displaying grey literature

1st author, year, country	Type	Study design	Pregnancy period	Population	Comparative group	Instrument	Maternal Mental Health Variables	Summary of findings
Brandon, 2006, USA	Doctoral dissertation	Cross sectional, observational	Prenatal	Women hospitalised with high risk of maternal or fetal demise	Women with uncomplicated pregnancy	DEQ MAAS EPDS CED-S	Self-criticism, dependency, object representation and risk	Mothers hospitalized because of maternal risk were not significantly different in their reports of attachment than were mothers hospitalized because of fetal risk, and no significant differences were found across severity of risk factors as evaluated by the Hobel Risk Assessment.
Rifkin, 2007, USA	Doctoral dissertation	Cross sectional observational	Prenatal	Women hospitalised with high risk of maternal or fetal demise	Women with uncomplicated pregnancy	MAAS DAS EPDS STAI CES-D	Depression and anxiety	Findings suggest that the quality of a woman's relationship with her partner influences the level of attachment to her fetus
Arnoni, 1990, USA	Doctoral dissertation	Waiting on abstract		Medically high risk pregnant women	Medically low risk pregnant women			
Law-Greenberg, 1991, USA	Doctoral dissertation	Waiting on abstract						

Appendix I: Participant information and consent information

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South Wales Doctoral Programme in Clinical Psychology
De Cymru Rhaglen Doethuriaeth mewn Seicoleg Glinigol

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Caerdydd CF10 3AT
Cymru Y Deyrnas Unedig

Informed Consent

Hello, you have been invited to take part in a Cardiff University Clinical Psychology research study focussing on the psychological impact of having experienced Hyperemesis Gravidarum.

Before you decide if you would like to take part it is important that you understand why the research is being done and what it will involve for you.

Reason for conducting this research

This study is being conducted to find out more about the impact of people's experience of Hyperemesis Gravidarum on their psychological wellbeing. It is hoped that this research will inform healthcare professionals of the psychological impact of HG and provide some clinical recommendations to improve perinatal psychological support for women who experience HG during pregnancy.

Can I take part?

You are invited to participate in this study if you meet the following criteria:

a) You are a Women over the age of 18
b) If you speak English
c) If you have sought medical support (e.g. visiting your GP or referred to hospital) for your severe morning sickness/Hyperemesis Gravidarum.

If you meet the above criteria, please continue reading this page to find out more about this research. If you would like to participate, please tick the informed consent box at the end the page. Once you have ticked the box, the online questionnaire will open for you to complete.

What will happen if I take part?

You will be asked to complete a secure online questionnaire. All responses to the questionnaire are confidential. The questionnaire will take X minutes to complete. We will contact you again in six months time and ask you to complete the questionnaires one final time. This is to explore how psychological wellbeing may change over time. At the end of the study, if you agree, you will be entered into a prize draw to win one of six £50 amazon vouchers. This is to acknowledge the time you have taken out form your day to participate and to show you our appreciation for this.

I understand that the personal data will be processed in accordance with GDPR regulations (see privacy statement below).

If you have a difficulty or disability which means that accessing this study online is troublesome for you, then additional paper or telephone access can be made available. Please contact Hayley or Lisa for more information.

Do I have to take part?

Your participation in this study is entirely voluntary.

We may wish to contact you in the future to collect further information, this is helpful as it can allow us to see if and how things change over time. If you are willing to be contacted in the future then you will be invited to leave your email address at the end of the survey. If you leave your email address your data will be stored confidentially and if you would like us to delete your data in the future, then we will be able to. If you do not leave your email, your responses will be stored anonymously so we will not be able to identify and withdraw your data once it has been entered into Qualtrics (this survey program).

What are the risks of taking part?

This research has been reviewed and approved by Cardiff University School of Psychology Ethics Committee. The questionnaire has been tested by several members from the charity *Pregnancy Sickness Support* . It is not expected that this study will cause any distress, but should reflecting on the questionnaire items be upsetting, you are encouraged to seek support from your GP or Pregnancy Sickness Support Charity. A list of support organisations will be provided at the end of the survey. If there is a disclosure of risk during the study process then researchers will need to break participant confidentiality in line with risk and safeguarding procedures. This is to ensure the safety of participants throughout.

How will information about me be used?

The results of the study will be written up as part of a Clinical Psychology Doctorate project and may be published in professional journals and/or shared at relevant conferences. A general summary of the findings will be shared through Pregnancy Sickness Support charity's website. You will not be identified by name in the dissemination of the results. If you would like to receive a copy of the final report when it is completed, please follow the link at the end of the survey.

Who will have access to information about me?

Survey responses are confidential as the Qualtrics system automatically generates numerical code for each participant. All research data will be stored in accordance with national policy ad legislation (The Data Protection Act_1998) and BPS Ethics guidelines for internet-mediated research (BPS, 2013). Any email addresses provided by participants for follow up studies in the future will be stored in secure password protected file that is not connected to their questionnaire data. The researcher and research supervisors will have access to the electronic research data. Research data will be stored for 15 years after completion of the study for academic purposes in accordance with Cardiff University Policy and destroyed thereafter.

What is there is a problem, or you have further questions?

If you have any concern or require additional information about any aspect of this study, please contact the researcher of research supervisor. If you would like to complain about this project, please contact Cardiff University School of Psychology Ethics Committee.

Researchers:

Hayley MacGregor, Trainee Clinical Psychologist
Email: MacGregorH@cardiff.ac.uk

Lisa Garvin, Trainee Clinical Psychologist

Email: GarvinL@cardiff.ac.uk

Research Supervisors:

Dr Helen Penny, Senior Research Tutor, Doctorate in Clinical Psychology, Cardiff University
Email: pennyH@cardiff.ac.uk

Dr Cerith Waters, Clinical Psychologist, Lecturer Cardiff University
Email: watersCS@cardiff.ac.uk

Complaints:

Cardiff University School of Psychology Ethics Committee

Ethics Secretary Mark Jones
Email: psychethics@cardiff.ac.uk

Please declare below that you are providing informed consent

[ ] I have read the above participant information and I therefore agree to provide my consent to participate in this study
[ ] I provide my consent to be contacted in the future for potential follow up research

Privacy Notice:

The information provided will be held in compliance with GDPR regulations. Cardiff University is the data controller and Matt Cooper is the data protection officer (inforequest@cardiff.ac.uk). The lawful basis for processing this information is public interest. This information is being collected by Hayley MacGregor and Lisa Garvin.

The information on the consent form will be held securely and separately from the research information.

Only the researchers will have access to this form and it will be destroyed after 7 years.

The research information you provide will be used for the purposes of research only and will be stored securely. Only the principal researchers Hayley MacGregor and Lisa Garvin and their research supervisors Dr Helen Penny and Dr Cerith Waters, will have access to this information.

Appendix J: Participant Debriefing Sheet

School of Psychology
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De Cymru Rhaglen Doethuriaeth mewn Seicoleg Glinigol

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Adeilad y Tŵr
Plas y Parc
Caerdydd CF10 3AT
Cymru Y Deyrnas Unedig

Psychological Impact of experiencing Hyperemesis Gravidarum

Debriefing Information Sheet

Thank you very much for taking part in this study.

We hope you found it interesting.

It is hoped that this research will inform healthcare professionals of the psychological impact of Hyperemesis Gravidarum (HG) and provide some clinical recommendations to improve support for women who experience HG during pregnancy. The findings will be published on Pregnancy Sickness Support website.

Further Support

Reflecting on your experience of having had Hyperemesis Gravidarum and the impact on your wellbeing may have been difficult for you. This is understandable and you may feel low after taking part in this questionnaire. If you do feel upset here are some suggested sources of support you may want to consider calling upon:

- Your friends and family may be able to provide you with immediate support.
- Your GP is also a potential source of support if you feel upset about what has been discussed for a longer than you feel comfortable with.
- Your GP can refer you to a Clinical Psychologist for support to talk through any difficulties that you experience and support you to cope with these

- There are also a number of organisations and charities that offer support. You may find some of these helpful.

Pregnancy Sickness Support (www.pregnancysicknesssupport.org.uk)

Pregnancy sickness support are a national Support Network for women suffering any degree of nausea and vomiting in pregnancy to access support and comfort at times of isolation and distress. The network is made up of volunteers who know first-hand the trials of nausea and vomiting in pregnancy. The website also provides information on treatments to discuss with your doctor and advice for coping strategies at home. The website hosts an online forum where you can access support from a number of women at almost any time of the day or night. PSS has developed leaflets and information for carers and partners and carers can register with their forum to access an area specifically for them.

PSS Helpline - 02476382020

Lines are open 9am-4.30pm Monday to Friday.

Mindline (https://www.mind.org.uk/)

Mindline is a confidential listening service to support anybody who is in distress. Mindline can guide you where to get help, discuss medication and alternative treatments, offer advocacy and look for details of help and support in your own area.

Mindline- phone 0300 123 3393 or text 86463

Lines are open 9am to 6pm, Monday to Friday (except for bank holidays).

The Samaritans (www.samaritans.org)

The Samaritans is a national charity and the co-ordinating body for the 201 Samaritans branches across the UK. The Samaritans aims to help alleviate emotional distress- you do not have to be suicidal to call

Samaritans helpline- call 116 123 from any phone for free

Lines are open 24 hours a day, 365 days a year.

If you have any further questions in relation to this study please contact us on the details below.

Contact details:

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If you have any concerns that you would like to raise about the research you can also contact our academic supervisor:

Contact details:

Name: Dr Helen Penny, Senior Clinical Tutor Cardiff University
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Thank you again for taking the time to participate

Privacy Notice: All personal data will be processed in accordance with GDPR regulations

The information provided will be held in compliance with GDPR regulations. Cardiff University is the data controller and Matt Cooper is the data protection officer (inforequest@cardiff.ac.uk). The lawful basis for processing this information is public interest. This information is being collected by Hayley MacGregor and Lisa Garvin. The information on the consent form will be held securely and separately from the research information. Only the researchers will have access to this form and it will be destroyed after 7 years.

The research information you provide will be used for the purposes of research only and will be stored securely. Only the principal researchers Hayley MacGregor and Lisa Garvin and their research supervisors Dr Helen Penny and Dr Cerith Waters, will have access to this information.

Student number: 1673571