Hypertension in pregnancy: Gaining insight into women's mental health and birth experience 6-12 months postpartum

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Doctor of Philosophy Degree

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Certificate of Original Authorship

I, Lynne ROBERTS, declare that this thesis is submitted in fulfilment of the requirements for the award of Doctoral Degree, in the Centre for Midwifery, Child and Family Health, Faculty of Health at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise reference or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

This research is supported by the Australian Government Research Training Program.

Signature:

Date:

Acknowledgements

Undertaking a PhD project was a big decision and required a great deal of work and commitment. I have worked hard on this project to focus on how to improve the care midwives provide to women with a complicated pregnancy. Although I was passionate about the topic of my research, it would not have been possible to complete this without the guidance, love and support that I received from many people.

The first person I want to thank is my primary supervisor, Caroline Homer. Caroline and I began this PhD with a history; we had worked together for many years and she had previously been my supervisor when I completed the Master of Midwifery Degree. We had an established friendship and relationship and knew we worked well together so I was thrilled when she offered to be my PhD supervisor. According to Caroline, my PhD is the longest in known research history due to the many years of her asking (nagging) before I was ready and agreeable to take on the task. I was simply waiting for the right time and the right project!

Caroline is the wisest, most generous, inspirational and patient woman I know. Generous with her time, sharing her knowledge and expertise and always there when you need a lift back on track and a turn in the right direction. Caroline has always given me time to learn new skills and helped me to master them. She instilled in me at an early stage of this journey that “doing a PhD is a learning process – learning how to research”. My learning curve was steep but achievable with Caroline’s direction. I thank her for this guidance and for her seemingly endless reading and reviewing of drafts, ideas and thoughts, valuable feedback and encouragement, and generally just being there.

I also want to thank my co-supervisor, Greg Davis. Greg and I have worked together for many years caring for women with complicated pregnancies and undertaking research projects. Working on a PhD project has enhanced our working relationship and friendship. Greg is a very practical person and was

always good at bringing me back to ground when things got tough. He has the most amazing eye for detail, can find a typo or extra space in any given page of text and can move words around to improve the flow and meaning of the text. I thank him for all his reading, reviewing and editing of drafts, his thoughts and feedback. I especially thank him for his support in the general running of the project, his advice on the work/life balance, and his ‘go to person’ recommendations if he could not help me.

The qualitative component of this project involved interviewing women which was something new to me. I had fabulous help with learning the fine art of interviewing from my dear friend and colleague, Nicki Watts. Nicki generously gave up her time to work with me in coming up with the interview questions and attended the first few interviews with me. I cannot thank her enough for ‘holding my hand’ while I overcame my nerves about interviewing.

Throughout the PhD years my friends have always been there for me. They may not have realised how important their friendship was during this time but I thank them for being in my life. Their sense of humour, our regular lunches, chats and annual weekend getaways have kept me in touch with the real world and given me a break from my PhD. I appreciate the love, support and laughs we all share and for your help with propping me up during challenging times.

The P4 Study Team has been extremely supportive and encouraging throughout this project. They have enabled me to claim one component of the large study as mine and always supported me with my work. I thank them all for this support and their friendship, respect, trust and belief in me. I also thank Professor Sam Harvey for his assistance in selecting the screening instruments used in this project and for introducing me to SPPS.

A project like this cannot be undertaken without the women who volunteer to participate. I thank the women who participated, for their time and commitment, and I especially thank those who shared their birth experience story with me. I know that this was not easy for all and often elicited emotional memories that

some found difficult to speak about. I would like to think that all the women who participated feel that they have contributed to improving the birth experience of women in future times.

Lastly, but importantly, I thank my family. My husband, Mark and our sons Alex and Lachlan have all tried hard not to annoy me too much. They have somehow known when to give me space, time and peace to work on my project. They have also accepted that I have sometimes been distracted and yet given me many words of encouragement and support. I particularly thank Mark for playing a sport that takes six hours (golf) so I could have time to write without feeling like I have neglected our relationship. I also thank him for showing me the importance of getting away from the laptop and going out to enjoy a walk or an outing. To Alex and Lachlan, I thank them for their patience, understanding and neck massages. Throughout this PhD project we have kept our close bond and managed to laugh at the end of the day. Thank you for your love and for always being there for me and each other.

It happened for a reason: A dedication

In 1993 I gave birth to my first son. He was born by emergency caesarean section at 30 weeks gestation. I had early onset preeclampsia and the only way to treat me was for him to be born.

I remember seeing his tiny face before he was taken to the resuscitaire to be cared for by the midwives and doctors. My memory of the following few days is patchy. He was born on a Saturday night and I spent the next three days in the intensive care unit at one hospital and he was transferred to the intensive care unit of another hospital. I finally saw him on the Monday.

My time in intensive care was necessary but distressing. There was no night and day differentiation in that place, just constant medications, checks, measures and alarms with a nurse sitting at the end of my bed, watching. I had no concept of time. I truly felt as though I was dying and told my husband and family this on several occasions. My thoughts were with my son, who I had not met yet. I had photos my brother had taken, but photos could not replace the feeling of giving my baby a cuddle or touching him.

On his way to see our son at the other hospital, my husband stopped off at a late night chemist and bought a teddy bear. It was the only one he could find late on a Saturday night. It didn't matter what it looked like, he didn't want his son to die without owning a teddy bear. I still have this bear and it holds many special memories for me. When my husband first visited our son he told the nurses that his name will be Alexander – he didn't want his son to die without having a name.

I cannot begin to imagine what this situation was like for my husband, family and friends.

When I first met Alexander I was not overwhelmed by all the tubes, machines and equipment. I was able to see through all the lifesaving technology and find

my tiny boy. Through my tears I managed to say ‘I’m sorry’ to him and gently stroke his tiny, fragile body. My first meeting with him was short as I was still very unwell and I had twisted my doctors’ arm hard enough to let me leave the hospital for this short period.

We both made good progress and I was home after a week. Coming home without my baby was another difficult time but I focussed on doing the one thing that only I could do for him - supply him with breast milk. This was a task I did very well indeed. He ran the usual course for a preterm baby such as being ventilated, having arterial lines, total parental nutrition (TPN) and lipids, jaundice requiring phototherapy, scans and X-rays and feeding issues. Imagine my joy when he had his first breast feed at five weeks old!

Alexander came home when he was almost seven weeks old. I was kept busy caring for him, feeding him and taking him to his many appointments for paediatrician check-ups, hearing and sight tests and physiotherapy. Keeping busy kept my mind off what had happened.

When Alexander had his first birthday we celebrated with family, food and cake. It was a very happy day and a significant milestone for Alexander considering his difficult start to life. However, throughout the day I was distressed. I was constantly recalling what happened this time last year and reliving my traumatic birth experience. I thought I just needed some more time to recover and I seemed to cope with the next birthday a little better than the previous one. A turning point for my recovery came a few years later when a psychiatrist said to me ‘you don’t need to get over it, in fact you probably won’t get over it. What you need is to find ways to cope with what happened and move on to enjoy your life’. And that is what I have done!

Since this experience and advice I have been determined to learn more about preeclampsia and to help improve the birth experience for the women who develop this complication in their pregnancy. My first step in achieving this was becoming a member of the multidisciplinary team caring for women with a

complicated pregnancy, particularly those with hypertension. Working as part of this team was extremely rewarding and I felt like I was making a difference to the care women were receiving. I started teaching the topic of hypertension in pregnancy in my workplace and at university, and soon became the resource midwife for anything to do with hypertension. I wanted all midwives to be well informed on hypertension so that the best care would be given. I was already a member of a support group based in Melbourne and I decided to start my own support group in Sydney. I was willing to give anything a go that meant a better experience for women and their babies following a pregnancy complicated by hypertension.

When I decided to undertake a PhD, there was never a question on what the topic would be. Anyone who knew me would give you the same answer, so it is no surprise that I have carried out a project about women's mental health and improving the birth experience for women who have their pregnancy complicated by hypertension.

This is a piece of work very dear to me and it will always hold a special place in my heart. Behind the toil of this project is a great personal passion and drive that has kept me focused and determined to do a good job. For all the women, their babies, their partners, family and friends, and everyone else who has been touched by preeclampsia or hypertension in pregnancy, I dedicate this work to you. May my work be helpful for all health care providers in improving the care we provide and therefore improving the birth experience for women who experience hypertension in their pregnancy.

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The Postpartum Physiology, Psychology and Paediatric follow-up Study

This PhD research project is one component of a large study, the Postpartum Physiology, Psychology and Paediatric follow-up (P4) Study (Davis et al. 2016), which is being conducted by the Obstetric Medicine Research Group (OMRG) at St George Hospital, Sydney. I am the overall P4 Study coordinator but I designed and led the mental health component of the study from the outset which makes up this PhD.

The P4 study is a prospective observational cohort study investigating the physical and mental health of women as well as the health and development of their children. Maternal and paediatric data are collected at six months, 2 years and 5 years postpartum following either a normotensive pregnancy or one complicated by hypertension (Figure a.). As the P4 Study coordinator I undertake all the postpartum measurements, collect data from the women, either from their medical record or directly from them via questionnaires, and organise the appointments for their children. The six month postpartum maternal psychological health component of the P4 Study is my PhD project, that is, the assessment of depression anxiety, PTSD and birth experience six months after a pregnancy complicated with either gestational hypertension (GH) or preeclampsia (PE) and normotensive pregnancy. Both my PhD supervisors are investigators in the P4 Study – Associate Professor Gregory Davis is the Principal Investigator.

I have worked with the OMRG from the inception of the P4 Study. I have been involved in the design, ethics approval application and subsequent annual reports, questionnaire and case report form design, screening instrument selection, recruitment, carrying out assessments, accurate data collection and entry, and all follow-up required. The study is still actively recruiting and following-up women and their babies.

Figure a. Model of the P4 Study

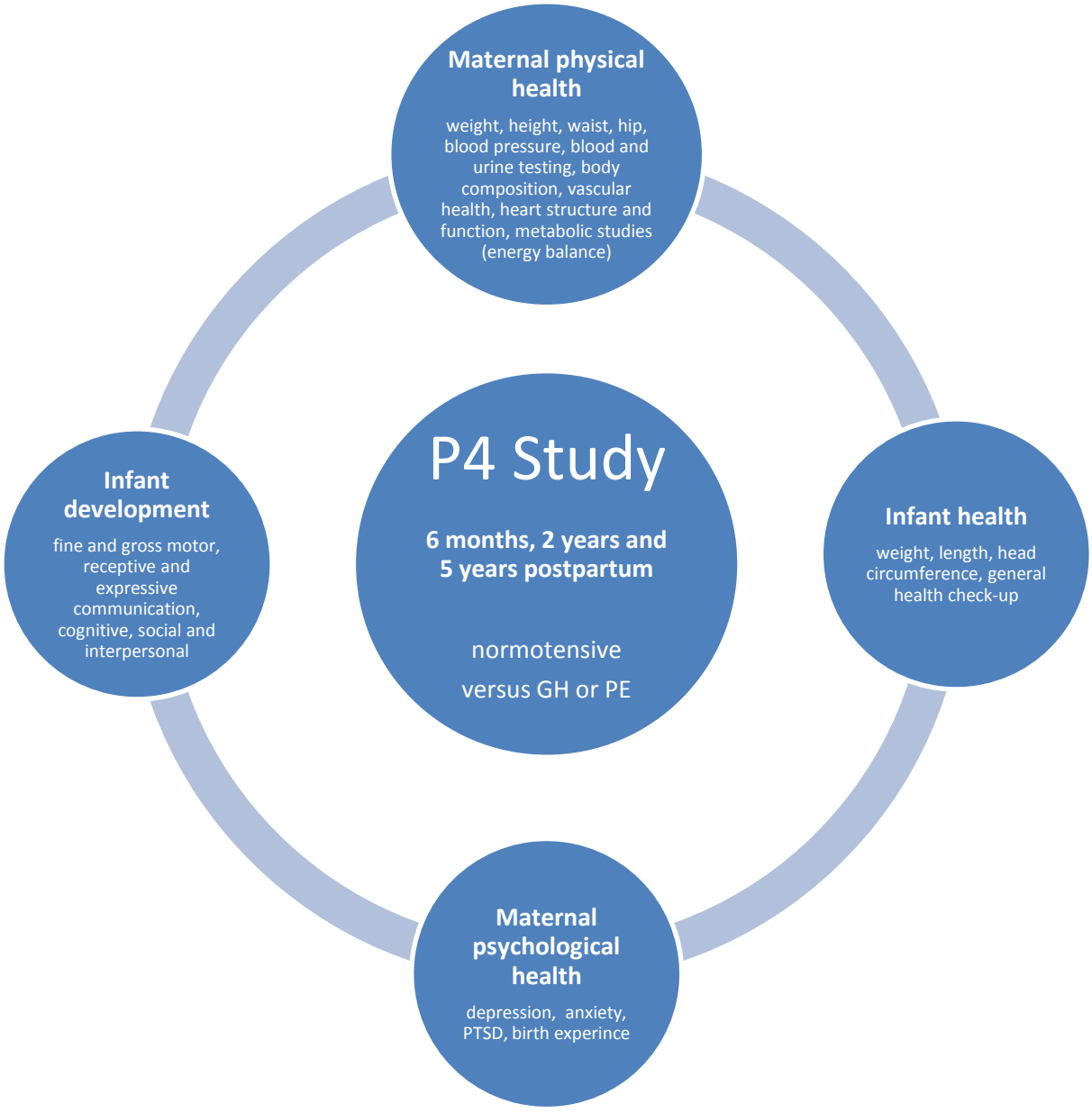

Figure b. Hypotheses and Outcomes of the P4 Study

Hypotheses

1. That women who have had hypertension in pregnancy:
a). Have risk factors for CVD that are only recognised by comparison with a new 'normal' range for blood pressure and other cardiovascular risk factors;
b). Have a higher prevalence of psychological morbidity postpartum.

2. That the offspring of women who have had hypertension in pregnancy have a greater likelihood of abnormal growth and development six months after birth.

Outcomes

1. The primary outcome is the prevalence of women in the formerly hypertensive groups with mean 24 hour systolic or diastolic BP two standard deviations greater than the mean BP derived from women who had normal pregnancies.

2. Secondary outcomes are:
a) physiological measures: central BP, body composition, energy balance, cardiac function, renal function, lipids, insulin resistance (HOMA score) and urinalysis;
b) psychological measures: depression, anxiety, post-traumatic stress and mother-infant bonding; and
c) infant health: physical health and development.

3. Development of guidance for the assessment, treatment and follow up of:
a) Women who have increased risk factors for later CVD;
b) Women who have psychological morbidity after hypertension in pregnancy; and
c) Children with physical or developmental impairment after maternal hypertension in pregnancy.

(Davis et al. 2016)

P4 Study Funding

The P4 Study is funded in part by the St George and Sutherland Medical Research Foundation and generous philanthropic donations. This funding covers the general operational costs of the study at St George Hospital and is insufficient to fund the study being carried out at other sites.

Publications and presentations

There have been a number of publications and conference presentations resulting from the P4 Study. Those related to this PhD project are listed below. I took the lead role on all the publications and presentations related to this PhD.

Publications

Roberts LM, Davis GK, Homer CS. 2017. Pregnancy with gestational hypertension or preeclampsia: A qualitative exploration of women's experiences*. Midwifery*. 46:17-23.

Davis GK, **Roberts L**, Mangos G, Henry A, Pettit F, O'Sullivan A, Homer CS, Craig M, Harvey SB, Brown MA. 2016. Postpartum physiology, psychology and paediatric follow up study (P4 Study) - Study protocol. *Pregnancy Hypertension*. 6(4):374-379.

Oral Presentations

Roberts LM. 2018. Women's mental health following a hypertensive pregnancy. Nursing and Midwifery Research Showcase. St George Hospital. Sydney, Australia.

Roberts LM. 2018. How do women report their birth experience six months following a normotensive versus hypertensive pregnancy? Society of Obstetric

Medicine of Australia and New Zealand, Annual Scientific Meeting. Cairns, Australia.

Roberts LM. 2018. The P4 Study. St George Hospital Hypertension in Pregnancy Education Day. Sydney, Australia.

Roberts LM. 2017. Hypertension in pregnancy: Gaining insight into women's mental health and birth experience 6-12 months postpartum. Australian College of Midwives 20th National conference. Adelaide, Australia.

Roberts LM. 2017. Women's mental health after hypertension in pregnancy. 31st ICM Triennial Congress, Toronto, Canada. (this presentation was part of an expert panel session titled Hypertension in pregnancy – How can midwives make a difference?)

Roberts LM. 2016. Postpartum, Physiology, Psychology, Paediatric follow-up study (P4 Study). St George Hospital Nursing and Midwifery Grand Rounds. Sydney, Australia.

Roberts LM. 2016. Hypertension in pregnancy: Gaining insight into women's mental health and birth experience 6-12 months postpartum. Society of Obstetric Medicine of Australia and New Zealand, Annual Scientific Meeting. Alice Springs, Australia.

Roberts LM. 2015 Hypertension in pregnancy and the P4 Study. St George Hospital Midwifery Seminar. Sydney, Australia.

Poster presentations

Roberts LM, Davis GK, Henry A, Homer, CS. 2018. Hypertension in pregnancy: Gaining insight into women's mental health and birth experience 6-12 months postpartum. 18th Congress of the International Society of Hypertension in Pregnancy, Amsterdam, The Netherlands.

Roberts LM, Homer SE, Davis GK. 2016. Women's mental health after hypertension in pregnancy. 31st ICM Triennial Congress, Toronto, Canada.

Roberts LM, Homer SE, Davis GK. 2015. Does hypertension in pregnancy impact the women's mental health postnatally? St George and Sutherland Medical Research Foundation Symposium. Sydney.

Roberts LM, Homer SE, Davis GK. 2015. Does hypertension in pregnancy impact the women's mental health postnatally? Australian College of Midwives 19th National Conference. Gold Coast.

Roberts LM, Homer SE, Davis GK. 2015. Does hypertension in pregnancy impact the women's mental health postnatally? SOMANZ Annual Scientific Meeting. Melbourne.

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2017 $1500 Scholarship from the Australian College of Nursing to attend the ACM conference in Adelaide.

2016 $3000 Health Services Practice Research Student Development Award UTS to attend the 31st ICM Triennial Congress- Midwives Making a Difference in Toronto, Canada.

2015 $1500 Scholarship from the Australian College of Nursing to attend the ACM conference on the Gold Coas.t

2013 Australian Government Research Training Program funding this PhD.

Tables and Figures

Abstract

Background

Pregnancy and childbirth, while usually joyful experiences, can be traumatic leading to depression, anxiety and post-traumatic stress disorder (PTSD). Women may be more prone to psychological morbidity following a complicated pregnancy and/or birth.

Hypertension in pregnancy (HIP) is the most common medical complication of pregnancy. Women diagnosed with HIP require more intensive monitoring, antenatal admissions, a longer postnatal stay that may include acute care, and some give birth to a preterm baby requiring time in a nursery.

There are reports of the short and long term health risks following HIP, particularly cardiovascular health, but there is limited knowledge about the impact on mental health, birth experience, and whether the care received influences women's experiences.

Aim

The aim of this study was to investigate the mental health (depression, anxiety and posttraumatic stress disorder) and childbirth experiences at six to 12 months postpartum in women who had HIP and those who had normal blood pressure (normotensive) in pregnancy.

Methods

This was a longitudinal prospective observational study using mixed methods. There were two phases:
1) the mental health of women and their birth experience following a normotensive pregnancy or one complicated by hypertension, using a quantitative design; and,

2) the experience of women who had HIP, using a qualitative approach.

At six months postpartum, women completed four screening instruments: the Edinburgh Postnatal Depression (EPDS), General Anxiety Disorder (GAD), Posttraumatic Stress Diagnostic, and Maternal Infant Bonding (MIB) scales. Birth experience data were collected using a seven point Likert Scale and two open ended questions. The qualitative component used individual, face-to-face, semi-structured interviews with a subset of 20 women at 10-12 months postpartum.

Descriptive statistics, univariate and multivariate logistic regression and ordinal regression analyses were conducted on the quantitative data, with a thematic analysis undertaken on the interview transcripts.

Results

There were 237 women in the normotensive (NT) group and 84 in the hypertensive (HT) group. Both groups had similar demographic characteristics. Compared to the NT group, the HT group experienced more interventions during labour and birth, with the HT group having higher rates of induction of labour (70% versus 29%, p=<0.001) and caesarean sections (43% versus 18%, p=<0.001) compared to the NT group.

Women in the HT group recorded significantly higher mean EPDS score (p=0.03) and more scored above the threshold for possible depression (p=0.03) compared to women in the NT group. There were no differences in anxiety, PTSD or bonding scores between groups. The proportion of women who identified their birth experience as traumatic was greater in the HT group (p=0.006). The strongest predictor of possible depression in the whole cohort was being a first time mother (AOR 5.03; 95% CI 1.19-21.3), and for PTSD it was having a preterm baby (AOR 7.46; 95% CI 0.61-91.17). Women in the NT group were three to five times more likely to respond positively to the birth experience questions.

The qualitative study identified the themes: reacting to the diagnosis, challenges of being a mother, processing and accepting the situation, and moving on from the experience. Mediating factors that improved the women's experience were: feeling safe and trusting the care providers, continuity of care and carer, and valuing social support from partner, family and friends.

Discussion

Although the results showed more depressive symptoms in the women in the HT group and more reported their birth as a traumatic event, the prevalence of depression and PTSD was less than that previously reported in the literature. In an effort to further improve social, emotional and mental health outcomes for women, four elements of care are suggested. These are based on the quantitative and qualitative findings and current evidence: providing continuity of midwifery care in a collaborative model, facilitating social support for the woman, prevention and early identification of poor mental health, and keeping mother and baby connected.

Conclusion

Women have profound experiences after the diagnosis of HIP. They face challenges for months after the birth of their baby. It is essential for women to have access to appropriate multidisciplinary collaborative models of care, prompt referral to mental health services, and social support following a pregnancy complicated with hypertension. Furthermore, it is essential that maternity care providers keep the woman and her baby connected despite the physical separation that sometimes occurs.

ABBREVIATIONS

AAPEC	Australian Action on PreEClampsia
ALT	alanine aminotransferase
AOR	adjusted odds ratio
AST	aspartate amino transaminase
BDI	Beck Depression Inventory
BP	blood pressure
BSSS	Breslau Short Screening Scale
CASP	Critical Appraisal Skills Programme
CBT	Cognitive Behavioural Therapy
CES-D	Center for Epidemiological Studies Depression Scale
CI	confidence interval
COPE	Centre Of Perinatal Excellence
CPAP	continuous positive airway pressure
CTG	cardiotocograph
DBP	diastolic blood pressure
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders (4th Edition)
DSM-V	Diagnostic and Statistical Manual of Mental Disorders (5th Edition)
EDC	expected date of confinement
EPDS	Edinburgh Postnatal Depression Scale
GAD	general anxiety disorder
GH	gestational hypertension
GP	General Practitioner
HADS	Hospital Anxiety and Depression Scale
HDP	hypertensive disorders of pregnancy
HELLP	haemolysis, elevated liver enzymes, low platelets
HIP	hypertension in pregnancy
HREC	Human Research Ethics Committee
HT	hypertensive
IBM SPSS	Statistical Package for the Social Sciences

ICU	Intensive Care Unit
ID	identification
IES	Impact of Event Scale
ISSHP	International Society of the Study of Hypertension in Pregnancy
MIB	Mother to Infant Bonding
NHMRC	National Health and Medical Research Council
NICE	National Institute for Health and Care Excellence (UK)
P4 Study	Postpartum Physiology, Psychology and Paediatric Study
NICU	Neonatal Intensive Care Unit
NSW	New South Wales
NT	normotensive
OMRG	Obstetric Medicine Research Group
OR	odds ratio
PDS	Posttraumatic stress Diagnostic Scale
PDS-5	Posttraumatic stress Diagnostic Scale for DSM-V
PE	preeclampsia
PIS&CF	Participant Information Sheet and Consent Form
PMHS	Perinatal Mental Health Service
PP	postpartum
PPD	postpartum depression
PPV	positive predictive value
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSS	Posttraumatic stress Symptom Scale
PSSR-SR	PTSD Symptom Scale Self-Report questionnaire;
PTB	preterm birth
PTSD	posttraumatic stress disorder
SBP	systolic blood pressure
SCL-90	90 item Symptom Check List
STAI	State Trait Anxiety Inventory
TPN	total parental nutrition
UOR	unadjusted odds ratio

US	United States
UTS	University of Technology Sydney
ZDS	Zung Depression Scale