

Available online at www.sciencerepository.org

Science Repository



Research Article

Evaluation of Postpartum Counseling on Future Health Risks Associated with Hypertensive Disorders of Pregnancy

Jourdan E. Triebwasser^{1*}, Jennifer Lewey² and Elizabeth S. Langen³

¹Assistant Professor, Division of Maternal-Fetal Medicine, Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania, USA

²Assistant Professor, Division of Cardiovascular Medicine, Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania, USA

³Assistant Professor, Department of Obstetrics and Gynecology, University of Michigan, Ann Arbor, Michigan, USA

ARTICLE INFO

Article history:

Received: 23 March, 2020

Accepted: 9 April, 2020

Published: 14 April, 2020

Keywords:

Cardiovascular risk

fourth trimester

gestational hypertension

hypertensive disorders of pregnancy

preeclampsia

postpartum care

ABSTRACT

Background: The American College of Obstetricians and Gynecologists and the American Heart Association recommend that women with hypertensive disorders of pregnancy be counseled on lifelong cardiovascular risks and transitioned to primary care for ongoing screening and management.

Objective: To assess frequency and content of postpartum counseling regarding cardiovascular risk and follow-up among women with hypertensive disorders of pregnancy.

Study Design: A secondary analysis of a randomized trial of women with hypertensive disorders of pregnancy, excluding chronic hypertension, performed at a single tertiary care academic hospital. We abstracted documented counseling on hypertensive disorders from the discharge summary and postpartum visit note in the electronic medical record. We defined counseling as documentation of any one of the following: 1) recommending aspirin in a future pregnancy, 2) follow-up with primary care, or 3) lifelong risk of cardiovascular disease. We used logistic regression models to estimate adjusted odds for receiving counseling.

Results: Seventy-four women enrolled in the study. A hypertensive diagnosis was documented for 71 women (96.0%) in the discharge summary, but only 11 (14.9%) had any documented counseling in the discharge summary or postpartum visit note. Of the 11 women counseled, 5 (6.7%) were counseled on taking aspirin in a future pregnancy, 5 (6.7%) were counseled on follow-up with primary care, and only 3 (4.1%) were counseled on the lifelong cardiovascular risk associated with hypertension in pregnancy. Two women (2.7%) were counseled on follow-up with primary care and lifelong cardiovascular risk. There were no participants counseled on all three components. Later gestational age at delivery was associated with lower odds of counseling (adjusted OR 0.49, 95% CI 0.27-0.89).

Conclusion: Despite consistent evidence on long-term risks of hypertensive disorders of pregnancy, counseling about those risks is suboptimal. Improved communication of risks is the first step towards improving maternal health in the “fourth trimester” and beyond.

© 2020 Jourdan E. Triebwasser. by Science Repository.

Introduction

Hypertensive disorders of pregnancy (HDP), such as preeclampsia (PEC) and gestational hypertension (GHTN), complicate up to 10% of all pregnancies and are independent and underappreciated risk factors for future cardiovascular disease (CVD) [1]. HDP are associated with an

increased risk of cardiometabolic disease, such as chronic hypertension and diabetes, and increase the risk of ischemic heart disease, stroke, and heart failure 2-4-fold over the long term [2-5]. Approximately 20% of women with HDP are at risk of recurrent HDP in future pregnancies, increasing the risk of fetal and maternal complications [1, 6].

*Correspondence to: Jourdan E. Triebwasser, M.D., Assistant Professor, Perelman School of Medicine, University of Pennsylvania, Pennsylvania Hospital, 2 Pine East, 800 Spruce Street, Philadelphia, Pennsylvania 19107, USA. Tel: 2158297465; Fax: 2158293973; E-mail: jourdan.triebwasser@penmedicine.upenn.edu

In light of short and long-term risks associated with HDP, the American College of Obstetricians and Gynecologists (ACOG) recommends that women with pregnancies complicated by HDP should receive additional counseling during the postpartum period that focuses on the assessment of cardiovascular disease risk, screening and treatment of cardiometabolic risk factors, plan for annual assessment to monitor and reduce cardiovascular risk, and referral to primary care or cardiology for women with PEC [7]. Women should additionally receive counseling on the role of aspirin to reduce the risk of preeclampsia in future pregnancies for which there is a growing body of evidence [8-10]. The American Heart Association recently partnered with ACOG to emphasize the postpartum period as an important opportunity to identify and intervene upon women at high-risk for future CVD [11].

With a new focus on the “fourth trimester,” particularly among women with complicated pregnancies, it is important to establish how women are currently being counseled about their ongoing risks in the postpartum period and beyond [7]. Our objective was to assess the frequency and content of postpartum counseling after HDP. We additionally sought to understand patient characteristics that may affect the likelihood of receiving counseling.

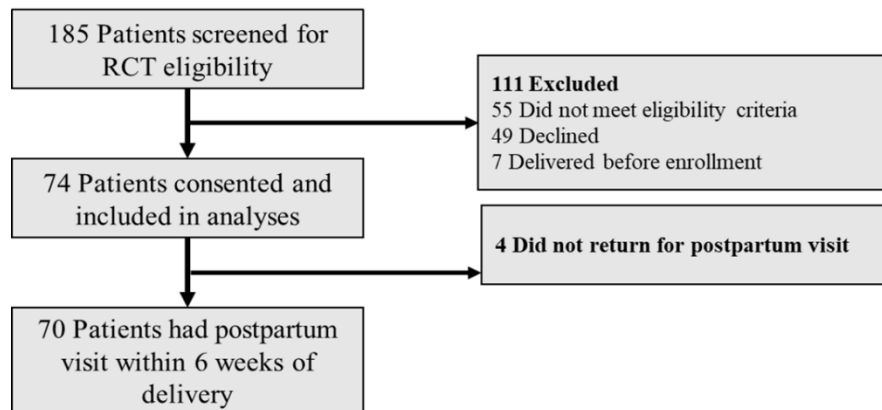


Figure 1: Study Population.
RCT: randomized controlled trial.

II Patient Population

Women aged 18–45 with singleton gestations taking one or fewer oral medications for blood pressure control were eligible for the trial. We defined GHTN and PEC without severe features according to criteria previously defined by ACOG [1]. Trial exclusion criteria were chronic hypertension, planned cesarean delivery, moderate or severe persistent asthma, chronic opiate use (daily use for at least 2 weeks), therapeutic anticoagulation, and inability to consent in English. Women with allergies to NSAIDs, aspirin, acetaminophen, or lactose were excluded due to study treatments in the trial. Women were not randomized if they developed severe features of PEC prior to delivery, they delivered by cesarean, or they received additional anesthesia beyond usual labor regional anesthesia (e.g. sedation for laceration repair). However, these participants were included in this analysis.

III Covariates and Outcomes

We abstracted baseline demographic and clinical characteristics from the electronic medical record and from enrollment surveys, including hypertensive diagnosis (at time of last contact), history of HDP, diabetes,

Materials and Methods

I Study Design

We performed a secondary analysis of women initially diagnosed with GHTN or PEC without severe features who enrolled in a randomized trial assessing the blood pressure effect of ibuprofen versus acetaminophen used for postpartum pain control. Women were consented for the trial either during antepartum care after a diagnosis of HDP (n=4) or during their delivery admission (n=70). Written informed consent was obtained from all participants, and the women consented to participation in data abstraction through 6 weeks postpartum. This current analysis includes all enrolled women regardless of whether the participant was randomized (Figure 1). The study was conducted at a single, tertiary care academic medical center with participants recruited from all services providing obstetric care (Obstetrics & Gynecology, Maternal-Fetal Medicine, Family Medicine, and Certified Nurse Midwives). Enrollment occurred between December 1, 2016 and January 31, 2018. Before recruitment began, approval was obtained from the institutional review board (HUM00117154). The parent trial was registered with ClinicalTrials.gov (NCT 02891174).

and mode of delivery. The primary outcome was documentation of postpartum counseling related to HDP in either the hospital discharge summary or postpartum visit note. Counseling was defined as any of the following: recommending aspirin in a future pregnancy to reduce the risk of recurrent preeclampsia, recommending follow-up with a primary care provider, or discussing the increased lifelong risk of cardiovascular disease. A single author performed detailed chart abstraction of the discharge summary and postpartum visit note to determine if counseling occurred. If counseling was uncertain on the initial review, the documentation was adjudicated by two authors.

To compare counseling on HDP to other recommended components of postpartum care, we assessed documentation of a contraceptive plan and plan for glucose tolerance test among those with gestational diabetes (GDM).

IV Analysis

Comparisons were performed using Chi-square test, Fisher’s exact test, Student’s t-test, and Wilcoxon rank test as appropriate. The Shapiro Wilk test was performed to test for the normality of continuous variables.

A backward stepwise multiple logistic regression retaining variables with $p < 0.2$ was performed to assess predictors of counseling regarding HDP. All statistical analyses were performed using STATA (Version 15; StataCorp, College Station, TX). A p -value < 0.05 was considered significant without correction for multiple comparisons.

Results

Between December 1, 2016 and January 31, 2018, 74 women were enrolled in the study and 70 (94.5%) women returned for a postpartum visit. Postpartum visits occurred at a median of 5.0 weeks (interquartile range 4.4-6.0 weeks) after delivery. A hypertensive diagnosis was listed

in 71 discharge summaries versus 45 postpartum notes (96.0% vs. 64.3%, $p = 0.049$). The final hypertensive diagnoses for the cohort were GHTN ($n = 46$, 62.2%), PEC without severe features ($n = 15$, 20.3%), and PEC with severe features ($n = 13$, 17.6%).

Eleven women (14.9%) had documented counseling about HDP in the discharge summary or postpartum visit note. Characteristics of the population by counseling status are shown in (Table 1). Women who received any counseling delivered at an earlier gestational age than women who did not receive counseling (37.7 versus 39.1 weeks, $p = 0.006$) but were otherwise similar to those who were not counseled about HDP. All but two deliveries occurred at term.

Table 1: Obstetric and demographic characteristics.

Characteristic	Counseled (n=11)	Not Counseled (n=63)	P-value
Maternal age, years	32.3±6.9	29.3±5.8	0.13
GA at delivery, weeks	37.7±0.7	39.1±1.5	0.006
BMI, kg/m ²	33.3 (30.1, 46.5)	34.9 (30.0, 39.3)	0.77
Race/Ethnicity			0.52
Non-Hispanic white	9 (81.8)	54 (85.7)	
Hispanic white	1 (9.1)	1 (1.6)	
Black/African American	1 (9.1)	6 (9.5)	
Other	0 (0.0)	2 (3.2)	
Nulliparity	6 (54.6)	48 (76.2)	0.14
Marital Status			0.41
Single	2 (18.2)	16 (28.6)	
Lives with partner	1 (9.1)	1 (1.6)	
Married	8 (72.7)	42 (66.7)	
Other	0 (0.0)	2 (3.2)	
Insurance			0.68
Public/Medicaid	1 (9.1)	13 (20.6)	
Commercial	10 (90.9)	50 (79.4)	
Diabetes*	1 (9.1)	8 (12.7)	1.00
History of PEC/GHTN	3 (27.3)	9 (14.3)	0.37
Taking prophylactic aspirin	3 (27.3)	7 (11.1)	0.16
Hypertensive diagnosis			0.21
GHTN	6 (54.6)	40 (63.5)	
PEC	1 (9.1)	14 (22.2)	
PEC with severe features	4 (36.4)	9 (14.3)	
Cesarean delivery	3 (27.3)	19 (30.2)	1.00
Postpartum readmission	1 (9.1)	8 (12.7)	1.00

GA: gestational age; BMI: body mass index; PEC: preeclampsia; GHTN: gestational hypertension.

Data presented as mean ± standard deviation, median (interquartile range), or n(%). Comparisons performed using t-test, Wilcoxon rank sum, and Fisher exact test.

*Includes gestational and pregestational diabetes.

Counseling on aspirin in future pregnancies was documented for 5 (6.7%) women. Follow-up with a primary care provider was recommended to 5 (6.7%) women. The lifelong risk of cardiovascular disease after HDP was only documented for 3 (4.1%) women. Two women (2.7%) were counseled on the lifelong risk of cardiovascular disease and follow-up with a primary care provider. No participants were counseled on all three components.

Associations between participant characteristics and counseling on HDP are shown in (Table 2). In unadjusted analyses, only gestational age at delivery was associated with counseling. After adjusting for severe features, again, only gestational age at delivery (in weeks) was

associated with counseling (adjusted OR 0.49, 95% CI 0.27-0.89), with those delivered at later gestational ages being less likely to receive counseling.

Women were significantly more likely to be counseled about contraception compared to HDP ($p < 0.001$), as all 74 participants had a documented contraceptive discussion. Only 1 participant (1.4%) was undecided on contraception, and 12.2% of women declined contraception. Five women had GDM, and all of these women were counseled on the need for a two-hour glucose tolerance test.

Table 2: Characteristics and association with postpartum counseling.

Characteristic	OR (95% CI)	Adjusted OR (95% CI)*
Maternal age, years	1.08 (0.96-1.21)	1.09 (0.97-1.23)
GA at delivery, weeks	0.48 (0.27-0.86)	0.49 (0.27-0.89)
Delivery BMI, kg/m ²	1.03 (0.94-1.13)	0.98 (0.88-1.08)
Nulliparity	0.34 (0.09-1.29)	0.45 (0.11-1.89)
Commercial insurance	2.29 (0.26-19.82)	3.21 (0.31-33.41)
PEC with severe features	3.64 (0.87-15.33)	3.13 (0.66-14.83)
Taking prophylactic aspirin	2.79 (0.59-13.04)	1.70 (0.30-9.51)

OR: odds ratio; CI: confidence interval; GA: gestational age; BMI: body mass index; PEC: preeclampsia.

*Logistic regression models adjusted for gestational age and severe features.

Discussion

We demonstrated that future risks related to HDP are infrequently communicated with women after delivery despite high rates of postpartum follow-up in our cohort. We found that hypertensive diagnoses were listed at the time of hospital discharge but less often at the time of postpartum evaluation. In contrast to counseling about HDP, we found that contraceptive counseling and screening for diabetes were routinely documented.

Professional societies such as ACOG, the American Heart Association, and the Society for Maternal-Fetal Medicine recommend postpartum counseling for women with HDP but offer limited guidance on counseling best practices or additional screening modalities [7, 12, 13]. Surveys of gynecologists demonstrate recognition of preeclampsia as a cardiovascular risk factor, but screening beyond blood pressure and BMI is infrequent [14, 15]. Despite provider awareness and professional society recommendations, a minority of women in our study received any counseling related to future risks or transitions to primary care. Ehrenthal *et al.* conducted a study of women with GDM and HDP, which demonstrated a similar postpartum follow-up rate to ours (95%), but 56% of the women with HDP had been told to seek follow-up care from a PCP prior to their hospital discharge [16]. Recommendations for aspirin in future pregnancies or discussion of cardiovascular risks were not addressed in that study.

In contrast to the low frequency of counseling on HDP, we demonstrated universal documentation of contraceptive plans. This reflects the routine practice pattern within the study institution, where contraceptive counseling occurs throughout the prenatal and postpartum care. Two large studies in geographically distinct areas found that more than 80% of women received postpartum contraceptive counseling [17, 18]. Zapata *et al.* also reported the majority of women were counseled prenatally, and that counseling in both time periods was associated with increased odds of more effective contraceptive methods [18]. Socioeconomic status, education, and insurance coverage also influenced the content and delivery of contraceptive counseling in those studies [17, 18].

Our results demonstrate that there are many opportunities to improve the counseling of women with HDP. Extrapolating from the literature on GDM, the combination of prenatal and postnatal counseling improves communication between obstetric and primary care providers and may increase postpartum screening for diabetes [19, 20]. While hypertensive diagnoses are frequently made closer to delivery than GDM, there remain opportunities at the time of diagnosis or during antenatal testing

to discuss postpartum concerns and recommendations. Technology-based interventions, such as outpatient blood pressure monitoring with text-based feedback, may be another avenue for communicating with women in the postpartum period [21].

There is some data on postpartum maternal care clinics suggesting these focused clinics are able to identify women at particularly increased risk for primary prevention of CVD [22, 23]. Outcome data, such as change in weight or physical activity, as a result of these specialty clinics, is more limited [24]. Specialty postpartum clinics are not widely available but merit further study.

Future studies on counseling after HDP should address barriers to counseling with attention to social determinants of health and provider characteristics. There is an urgent need to develop best practices for effective counseling. Studies using innovative means of information-sharing should be pursued given the various time constraints and physical demands of the postpartum period. The impact of counseling on primary care follow-up should also be studied to inform clinical practice.

The strengths of the study are that it addresses a pressing problem in maternal health care that has received little attention and our prospective, detailed collection of patient information. We were also able to capture information about postpartum counseling on contraception and glucose testing to assess current gaps in provider-patient communication related to HDP. It is possible that discussions about future health and follow-up related to HDP occur but are not documented, although the consistent documentation of contraceptive and diabetes counseling make that possibility less likely.

The primary limitation of our study is that it represents practice patterns at a single academic institution. However, care is provided by multiple types and levels of obstetric care providers, including residents and faculty in Obstetrics & Gynecology and Family Medicine, as well as Certified Nurse Midwives. Additionally, the participants in the trial were mostly white, commercially insured, and had very high rates of postpartum follow-up, which limits the generalizability of our findings. We may have been biased towards lower counseling rates as the minority of patients in our cohort had severe features; however, counseling is recommended for all women with HDP [7, 13]. Our small sample size limits analysis of patient or provider characteristics that may be associated with recommended counseling practices. Despite consistent evidence on risks of HDP after pregnancy, counseling about those risks is suboptimal in the postpartum period. Improved communication of risks and facilitation of transitions of care are vital in reaching patient care goals in the “fourth trimester”.

Authorship

All of the authors have met the criteria for authorship.

Clinical Trial Registration

This is a secondary analysis of a randomized controlled trial registered with clinicaltrials.gov (NCT 02891174).

Funding

This work was supported by the Edward Swift Dunster, MD Fellow Research Award at the University of Michigan (Jourdan Triebwasser).

Conflicts of Interest

None.

REFERENCES

- American College of Obstetricians and Gynecologists, Task Force on Hypertension in Pregnancy (2013) Hypertension in pregnancy. Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy. *Obstet Gynecol* 122: 1122-1131. [Crossref]
- Timpka S, Stuart JJ, Tanz LJ, Rimm EB, Franks PW et al. (2017) Lifestyle in progression from hypertensive disorders of pregnancy to chronic hypertension in Nurses' Health Study II: observational cohort study. *BMJ* 358: j3024. [Crossref]
- Cirillo PM, Cohn BA (2015) Pregnancy complications and cardiovascular disease death: 50-year follow-up of the Child Health and Development Studies pregnancy cohort. *Circulation* 132: 1234-1242. [Crossref]
- Theilen LH, Fraser A, Hollingshaus MS, Shliep KC, Varner MW et al. (2016) All-Cause and Cause Specific Mortality after Hypertensive Disease of Pregnancy. *Obstet Gynecol* 128: 238-244. [Crossref]
- Wu P, Haththotuwa R, Kwok CS, Babu A, Kotronias RA et al. (2017) Preeclampsia and future cardiovascular health: a systematic review and meta-analysis. *Circ Cardiovasc Qual Outcomes* 10: e003497. [Crossref]
- van Oostwaard MF, Langenveld J, Schuit E, Papatsonis DN, Brown MA et al. (2015) Recurrence of hypertensive disorders of pregnancy: an individual patient data meta-analysis. *Am J Obstet Gynecol* 212: 624.e1-624.e17. [Crossref]
- American College of Obstetricians and Gynecologists (2018) ACOG Committee Opinion No. 736: Optimizing Postpartum Care. *Obstet Gynecol* 131: e140-e150. [Crossref]
- Roberge S, Nicolaidis K, Demers S, Hyett J, Chaillet N et al. (2017) The role of aspirin dose on the prevention of preeclampsia and fetal growth restriction: systematic review and meta-analysis. *Am J Obstet Gynecol* 216: 110-120. [Crossref]
- Rolnik DL, Wright D, Poon LC, O'Gorman N, Syngelaki A (2017) Aspirin versus placebo in pregnancies at high risk for preterm preeclampsia. *N Engl J Med* 377: 613-622. [Crossref]
- Tolcher MC, Chu DM, Hollier LM, Mastrobattista JM, Racusin DA et al. (2017) Impact of USPSTF recommendations for aspirin for prevention of recurrent preeclampsia. *Am J Obstet Gynecol* 217: 365.e1-365.e8. [Crossref]
- Brown HL, Warner JJ, Gianos E, Gulati M, Hill AJ et al. (2018) Promoting risk identification and reduction of cardiovascular disease in women through collaboration with obstetricians and gynecologists: a presidential advisory from the American Heart Association and the American College of Obstetricians and Gynecologists. *Circulation* 137: e843-e852. [Crossref]
- Mosca L, Benjamin EJ, Berra K, Bezanson JL, Dolor RJ et al. (2011) Effectiveness-based guidelines for the prevention of cardiovascular disease in women—2011 update: a guideline from the American Heart Association. *Circulation* 123:1243-1262. [Crossref]
- Iriye BK, Gregory KD, Saade GR, Grobman WA, Brown HL (2017) Quality measures in high-risk pregnancies: Executive Summary of a Cooperative Workshop of the Society for Maternal-Fetal Medicine, National Institute of Child Health and Human Development, and the American College of Obstetricians and Gynecologists. *Am J Obstet Gynecol* 217: B2-B25. [Crossref]
- van Kesteren F, Visser S, Hermes W, Teunissen PW, Franx A et al. (2016) Counselling and management of cardiovascular risk factors after preeclampsia. *Hypertens Pregnancy* 35: 55-61. [Crossref]
- Wilkins Haug L, Celi A, Thomas A, Frolkis J, Seely E (2015) Recognition by women's health care providers of long-term cardiovascular disease after preeclampsia. *Obstet Gynecol* 125: 1287-1292. [Crossref]
- Ehrenthal DB, Maiden K, Rogers S, Ball A (2014) Postpartum healthcare after gestational diabetes and hypertension. *J Womens Health* 23: 760-764. [Crossref]
- Coleman Minahan K, Aiken ARA, Potter JE (2017) Prevalence and Predictors of Prenatal and Postpartum Contraceptive Counseling in Two Texas Cities. *Womens Health Issues* 27: 707-714. [Crossref]
- Zapata LB, Murtaza S, Whiteman MK, Jamieson DJ, Robbins CL et al. (2015) Contraceptive counseling and postpartum contraceptive use. *Am J Obstet Gynecol* 212: 171.e1-171.e8. [Crossref]
- Jones KE, Yan Y, Colditz GA, Herrick CJ (2018) Prenatal counseling on type 2 diabetes risk, exercise, and nutrition affects the likelihood of postpartum diabetes screening after gestational diabetes. *J Perinatol* 38: 315-323. [Crossref]
- Stuebe A, Ecker J, Bates DW, Zera C, Bentley Lewis R et al. (2010) Barriers to follow-up for women with a history of gestational diabetes. *Am J Perinatol* 27: 705-710. [Crossref]
- Hirshberg A, Downes K, Srinivas S (2018) Comparing standard office-based follow-up with text-based remote monitoring in the management of postpartum hypertension: a randomized clinical trial. *BMJ Qual Saf* 27: 871-877. [Crossref]
- Cusimano MC, Pudwell J, Roddy M, Cho CK, Smith GN (2014) The maternal health clinic: an initiative for cardiovascular risk identification in women with pregnancy-related complications. *Am J Obstet Gynecol* 210: 438.e1-438.e9. [Crossref]
- Smith GN, Pudwell J, Walker M, Wen SW (2012) Risk estimation of metabolic syndrome at one and three years after a pregnancy complicated by preeclampsia. *J Obstet Gynaecol Can* 34: 836-841. [Crossref]
- Janmohamed R, Montgomer Fajic E, Sia W, Germaine D, Wilkie J et al. (2015) Cardiovascular risk reduction and weight management at a hospital-based postpartum preeclampsia clinic. *J Obstet Gynaecol Can* 37: 330-337. [Crossref]