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High-Risk Pregnancy: Postpartum Rehospitalization

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Abstract

OBJECTIVE—Examine frequency, timing, and reasons for maternal postpartum rehospitalizations and acute care visits 1 year postpartum after a high - risk pregnancy.

STUDY DESIGN—Secondary analysis of data collected during a randomized clinical trial of advanced practice nurses giving transitional care for women with high - risk pregnancies. The 171 women were primarily African American, never married, Medicaid eligible, diagnosed with pregestational diabetes (20), gestational diabetes (23), either diagnosed (48) or at risk (44) for preterm labor, and chronic hypertension (36).

RESULTS—Of the total rehospitalizations (17%) and acute care visits (32%), over one third occurred in the first 8 weeks postpartum. Chronic hypertensives and gestational diabetics had the highest rate of rehospitalization and proportion of acute care visits. Six women were rehospitalized for subsequent pregnancies.

CONCLUSION—Women with high - risk pregnancies have continued high health care resource use over the first postpartum year demonstrating the need for more intensive patient education and follow - up to improve outcomes and reduce resource use.

INTRODUCTION

Length of hospitalization following childbirth has decreased considerably over the past decade, from an average of 2.9 days in 1988[1] to 1.8 days in 1992[2] for vaginal births and from a mean of 6.1 days[3] in 1982 to 3.4 days in 1992[2] for cesarean birth. Because women now leave the hospital so soon after birth, it is imperative that health care providers appropriately screen for actual and potential problems before and following discharge. A woman who has a high-risk pregnancy is at risk for increased antenatal hospitalizations due to complications surrounding the pregnancy and her prepregnant condition.[4] Although research documents problems during the postpartum period for low-risk women, very little information is available on the incidence and reasons for postpartum rehospitalization and acute care visits for women with high-risk pregnancies. The purpose of this study was to describe the frequency, timing, and reasons for maternal postpartum rehospitalizations and acute care visits following medically high-risk pregnancies. Subjects included women with pregestational and gestational diabetes, diagnosed or at risk for preterm labor, or chronic hypertension.

Studies of women with low-risk pregnancies and normal vaginal births have reported rehospitalization rates of 0.59%[5] and 1.5%[6] during the first month after birth and 1.9% in the first 2 months after birth,[7] with a higher rate for women giving birth in a birthing center

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(1.4%) compared to women giving birth in a hospital (0.8%).[7] The rehospitalization rate in a sample of women with vaginal and cesarean births was less than 1% in a study by Bossert et al.[8] In studies of women after cesarean births, Donahue et al.[9] reported a rehospitalization rate of 2.5% in the first 8 weeks postpartum in women with unplanned cesarean delivery, 44% of whom had a high-risk pregnancy. Strong et al.,[10] reporting on a sample of women delivered by cesarean but with no pregnancy complications, found only one of their 200 women had a postpartum readmission. Major reported reasons for rehospitalization include fever and infection, postpartum bleeding, and blood pressure and blood sugar monitoring.[9,11]

Fewer studies have reported numbers, timing, and reasons for postpartum acute care visits. Research with women with low-risk pregnancies and vaginal births has found that 6.1% of women reported an acute care visit within the first 10 days postpartum[6] and 20% within 2 months postpartum.[7] In a study by Donahue et al.[9] of 122 women followed for 2 months after an unplanned cesarean birth, 19 (15.6%) required a total of 34 acute care visits, with 71% occurring during the first 4 weeks postpartum. Reported reasons for acute care visits include infection, wound separations, bleeding, and pain.[9,11]

Fewer studies have examined postpartum rehospitalizations and acute care visits in women with high-risk pregnancies. In their sample of 55 pregnant women with diabetes, York and Brown[12] reported 3 (5.5%) rehospitalizations and 3 (5.5%) acute care visits during the first 8 weeks postpartum. In their study of 68 postpartum women with low birth weight infants, Gennaro and Krouse[13] found that 48 (71%) women reported at least one acute care visit in the postpartum period. Four (5%) of these women had a chronic health problem that complicated the pregnancy. The average number of acute care visits was 2.2 per patient. Not unexpectedly, based on these few studies, when operative delivery and high-risk conditions are involved, rehospitalization rates over 8 weeks postpartum increase to between 2.5%[9] and 5.5%[12] compared to ranges of 0.5%[10] and 1.9%[7] reported for women with low-risk pregnancies.

METHODS

This study, a secondary analysis from a randomized trial[4] that tested a model of transitional care delivered by advanced practice nurses (APNs), examined the reasons and timing of postpartum rehospitalizations and acute care visits in five groups of high-risk pregnant women. Women in the sample had been diagnosed by their physicians as having a high-risk pregnancy and were separated according to physician diagnosis into five groups: gestational or pregestational diabetes, chronic hypertension, diagnosed preterm labor, and at risk for preterm labor. These groups represent the major categories of high-risk pregnancy. All women received their prenatal care and primary care at the clinic of a large tertiary care hospital. In the original study, the intervention group had half of their scheduled prenatal care delivered in the clinic substituted with care delivered in the woman's home by masters prepared APNs. The control group received routine prenatal care in the clinic. Women were enrolled in the trial during pregnancy once they were diagnosed as having a medically high-risk pregnancy.

Data collected on all rehospitalizations and acute care visits through 1 year after delivery for women in both the intervention and control groups were used for this secondary analysis. Rehospitalization included any admission to the hospital during the 1-year period following delivery. Data on lengths of stay for each rehospitalization were collected from hospital chart review and validated by attending physicians. Fewer women in the intervention group versus the control group were hospitalized during pregnancy (41 vs. 49).[4] An acute care visit included any nonroutine visit to the emergency room, walk-in clinic, or physician's office.

Routinely scheduled postpartum check-ups were excluded from analysis. Data on acute care visits were collected from chart review and monthly telephone calls to the women. The number of acute care visits did not differ between intervention and control groups.

SAMPLE

The sample consisted of 171 women with high-risk pregnancies. The primary diagnoses at enrollment in the study were 20 women with pregestational diabetes, 23 women with gestational diabetes, 48 women with diagnosed preterm labor, 44 women at risk for preterm labor, and 36 women with chronic hypertension. Inclusion criteria were: English speaking with access to a telephone and diagnosed with either pregestational or gestational diabetes, chronic hypertension, preterm labor or at high risk for preterm labor (uterine fibroids, previous preterm labor, multiple pregnancy, or Creasy score of 10 or greater[14]). Of the 188 eligible women, 15 were excluded because of psychiatric history (n=1), exclusionary criteria (n=8), and refusal to participate (n=6). Two women were lost to postpartum follow-up; their infants were stillborn.

RESULTS

Sample characteristics are presented in Table 1. Most of the women were African American, high school graduates, not married, and low income with public insurance, had at least one prior pregnancy (87.3%) and at least one prior live birth (74%). More than half of the current births were vaginal. Women in the five diagnostic groups were not significantly different on education, race, marital status, poverty status, family income, and whether this was their first pregnancy or first live birth. The high-risk groups differed significantly on age, $F(4,166)=9.63$, $p<0.01$; type of health insurance, $\chi^2=10.59$, $df=4$, $p=0.03$; and type of birth, $\chi^2=15.81$, $df=4$, $p=0.003$. Women diagnosed with preterm labor were significantly younger (M=22.6, SD=4.96) than women in the other four groups (M=27.0 to 30.1). Women in the diagnosed preterm labor group and chronic hypertension group had the highest proportion of women on public insurance (97.8% and 97.0%, respectively). Women diagnosed with preterm labor had the highest cesarean birth rate (75%).

Data on number and timing of postpartum rehospitalizations and acute care visits are reported in Table 2. Women with gestational diabetes had the highest rate of postpartum rehospitalization (26.1%) followed by women with chronic hypertension (22.2%). Women in the other three diagnostic groups were hospitalized at about the same rate. Women with chronic hypertension had the most cumulative hours of rehospitalization (635.3 hours), whereas women with pregestational diabetes had the greatest average length of stay (237.3 hours). Most of these rehospitalizations occurred in the first 8 weeks after delivery, although almost one third occurred between 24 and 52 weeks postpartum. The original study showed 13 rehospitalizations in the control group (usual care group) and 20 in the intervention group (APN transitional care group). Among those hospitalized, intervention women had shorter lengths of stay than controls (1.2±1.2 vs. 5.7±7.7; $t=1.88$; $p<0.05$).

Almost half of the women in the chronic hypertension group (47.2%) and the gestational diabetes group (47.8%) and over a third of the women in the diagnosed preterm labor group had acute care visits in the postpartum period. Women in the chronic hypertension group had the most acute care visits, followed by women in the diagnosed preterm labor group and those with gestational diabetes. The timing of these acute care visits was similar to the timing of rehospitalizations.

Reasons for rehospitalization by timing of the rehospitalizations are listed in Table 3. In the first 8 weeks postpartum, half of the rehospitalizations were directly related to complications or sequelae of the current pregnancy, including wound breakdown or infection, endometritis,

mastitis, and episiotomy complications. There was only one rehospitalization for blood pressure control in the hypertensive group and that occurred in the first 8 weeks. One woman with gestational diabetes was rehospitalized for blood sugar control between 8 and 16 weeks postpartum. The one rehospitalization for blood sugar control in the pregestational diabetes group occurred after 24 weeks postpartum and the woman had a secondary diagnosis of urinary tract infection and pyelonephritis. Six women — four in the diagnosed preterm labor group, and one each in the risk for preterm labor group and the chronic hypertension group — were rehospitalized for problems with a subsequent pregnancy.

Reasons and timing of acute care visits are presented in Table 4. In the first 8 weeks postpartum, the most common reason for acute care visits was abdominal wound infection, and all but one of these women were in the gestational or pregestational diabetes groups. About half of the visits were directly related to the pregnancy. There were eight visits for blood pressure checks in the chronic hypertension group and one visit for blood sugar check in the pregestational group. In the subsequent time periods, only five visits were related to the current pregnancy: two visits for blood pressure checks in the chronic hypertension group and one visit each for lochia problems, abdominal wound infection, and postpartum hemorrhage. All of these five visits occurred in the 8- to 16-week time period. Thus, after 8 weeks postpartum, the majority of visits were for common health problems.

DISCUSSION

Women with high-risk pregnancies are known to have high levels of health care resource use during the prenatal period.[4,15] Findings from the present study document high resource use following delivery as well. One of six women required a rehospitalization and almost one of five required an acute care visit in the first postpartum year. In the first 8 weeks postpartum, 7% of the study women required a rehospitalization, a rate considerably higher than that reported in other studies. York et al.[12] reported a rate of 5.4% in a sample of postpartum women with diabetes followed for 8 weeks. Donahue et al.[9] reported a rate of 2.5% for women with unplanned cesarean delivery, 44% of whom had experienced a high-risk pregnancy. Studies of women with uncomplicated vaginal deliveries found rehospitalization rates of less than 1.4% over a similar period.[7,11,16,17] The rate of acute care visits in the first 8 weeks (27%) is higher than the 20% reported by Waldenstrom and Nilsson[7] for women with uncomplicated vaginal deliveries or the 15.6% reported by Donahue et al.[9] over 8 weeks postpartum.

Based on study findings, over 36% of rehospitalizations occurred in the first 8 weeks and were highest in women with gestational diabetes. However, only two of the four rehospitalizations for this group were associated with the pregnancy. Rehospitalization for subsequent pregnancies for six women, four in the preterm labor group, was surprising. Preliminary follow-up indicated that these pregnancies were not planned. Similarly, in the group of women diagnosed with preterm labor, 16 of the 30 acute care visits were for reasons associated with preterm labor, genitourinary infections, vaginal discharge, and subsequent pregnancy. Counseling on family planning and predisposing factors for preterm labor, especially for women previously identified at high risk for preterm labor, could be especially helpful in reducing rehospitalizations and potentially subsequent preterm deliveries.

For patients with chronic hypertension, 12 (28.6%) of the acute care visits were for blood pressure checks and headache, a symptom often associated with hypertension. The chronic hypertension group had the highest total number of hours of hospitalization. For these women, postpartum care and patient teaching focused on hypertensive self-care management including emphasis on prescribed medications and strategies to promote adherence to the

medication regimen might reduce the number of rehospitalizations, the duration of those rehospitalizations, or the number of acute care visits. Women with chronic hypertension face health challenges throughout their life span, not just during pregnancy, and strategies to encourage blood pressure control will provide benefits that extend beyond the postpartum period.

Reduction in hospitalization is often used as a benchmark of success or as an outcome of care. Some of the rehospitalizations in the present study might not have been avoidable, particularly the wound and episiotomy infections. The hospitalizations for glucose monitoring might have been avoidable. In the postpartum period, there is an expectation of more physiologic stability. When considering the role of stress in blood glucose control, however, the mere fact of the high-risk pregnancy combined with new parenthood might have partially accounted for the need for rehospitalization.

In general, about one third of the rehospitalizations and the acute care visits occurred during the first 8 weeks postpartum. Thus, the first 8 weeks represent a time requiring close monitoring of women who have experienced high-risk pregnancies. This is consistent with current health care guidelines for postpartum follow up schedules but also reinforces the need for more careful postpartum monitoring of women who experience high-risk pregnancies. These women may need individual contact initiated by their health care providers in the form of telephone contacts or mailings to increase the likelihood that this follow-up does occur.

The remaining two thirds of the rehospitalizations and the acute care visits occurred after the first 8 weeks postpartum, demonstrating continued high health care resource use for these women. Early and consistent postpartum contact with women who have experienced high-risk pregnancies using approaches that combine education regarding signs and symptoms of complications, family planning, parenting, stress management, and monitoring for early detection of more common health care problems could potentially reduce the numbers of subsequent acute care visits, rehospitalizations, and cost of health care. Such an approach also holds the potential for health care education over time that may yield benefits for both the health of subsequent pregnancies as well as that of the children and family in general.

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Table 1

Sample Demographics (N = 171)

Characteristic	*n* (%)
Age	
Mean (SD)	26.7 (6.42)
Education	
< High school	62 (36.3%)
High school graduate	56 (32.7%)
>High school	53 (31.0%)
Race	
White	7 (4.1%)
Black	160 (93.6%)
Other	4 (2.3%)
Marital status	
Never married	128 (74.9%)
Married	25 (14.6%)
Divorced/separated/widowed	18 (10.5%)
Family income	
< $5,000	58 (36.3%)
$5,000 to $14,999	63 (39.5%)
$15,000 to $24,999	30 (18.6%)
≥$25,000	9 (5.6%)
Type of health insurance	
Public	149 (92.5%)
Private	12 (7.5%)
Type of birth	
Vaginal	98 (57.6%)
Cesarean	72 (42.4%)
Obstetric history	
First pregnancy	22 (12.7%)
First live birth	45 (26%)

Table 2

Rehospitalizations by Diagnostic Group for 1 Year Post Delivery

	Gestational diabetes (*n* = 23)	Pregestational diabetes (*n* = 20)	Diagnosed preterm labor (*n* = 48)	Risk for preterm labor (*n* = 44)	Chronic hypertension (*n* = 36)	Totals
Rehospitalizations						
No. of women	6 (26.1%)	3 (15.0%)	7 (14.6%)	5 (11.4%)	8 (22.2%)	29 (16.9%)
No. of rehospitalizations	6	3	7	7	10	33
Total hours (group)	139	486.32	337.58	163.76	635.3	
Length of Stay — *M* (SD)	27.8 (23.4)	162.1 (237.3)	42.2 (28.7)	27.3 (29.1)	63.5 (51.7)	
Timing of rehospitalization						
< 8 wks postpartum	4	2	2	2	2	12 (36.4%)
8 – 16 wks postpartum	1	0	0	1	3	5 (15.2%)
16 – 24 wks postpartum	0	0	2	3	1	6 (18.2%)
24 – 52 wks postpartum	1	1	3	1	4	10 (30.3%)
Acute care visits						
No. of women	11 (47.8%)	4 (20%)	17 (35.4%)	6 (13.6%)	17 (47.2%)	55 (32.2%)
No. of acute care visits	23	17	30	10	42	122
Timing of acute care visits						
< 8 wks postpartum	14	11	4	1	17	47 (38.5%)
8 – 16 wks postpartum	1	2	8	2	9	22 (18.0%)
16 – 24 wks postpartum	1	0	7	1	8	17 (13.9%)
24 – 52 wks postpartum	7	4	11	6	8	36 (29.5%)

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Table 3

Reasons for Rehospitalizations by Timing and Diagnostic Group

Weeks postpartum	Reason	Gestational diabetes (*n* = 23)	Pregestational diabetes (*n* = 20)	Diagnosed preterm labor (*n* = 48)	Risk for preterm labor (*n* = 44)	Chronic hypertension (*n* = 36)	Totals
< 8 weeks	Other *	2	0	0	1	0	3
	Wound breakdown	1	0	1	0	0	2
	Abdominal wound infection	1	0	0	0	0	1
	Endometritis	0	1	0	0	0	1
	Episiotomy complication	0	1	0	0	0	1
	Subsequent pregnancy	0	0	1	0	0	1
	Tubal ligation	0	0	0	1	0	1
	Mastitis	0	0	0	0	1	1
	Increased blood pressure	0	0	0	0	1	1
8 – 16 weeks	Tubal ligation	0	0	0	0	2	2
	Blood sugar control	1	0	0	0	0	1
	Increased blood pressure	0	0	0	1	0	1
	Postpartum hemorrhage	0	0	0	0	1	1
16 – 24 weeks	Subsequent pregnancy	0	0	2	0	0	2
	Tubal ligation	0	0	0	1	1	2
	Other *	0	0	0	1	0	1
	Gynecologic procedure	0	0	0	1	0	1
24 – 52 weeks	Subsequent pregnancy	0	0	2	1	1	4
	Gynecologic procedure	0	0	0	0	2	2
	Other *	1	0	0	0	1	2
	Blood sugar control + UTI/ pyelonephritis	0	1	0	0	0	1
	Peritonitis	0	0	1	0	0	1

* Included knee arthroscopy, exploration of brain tumor, multiple myeloma, gun shot wounds.

Table 4

Reasons for Acute Care Visits by Timing and Diagnostic Group

Weeks postpartum	Reason	Gestational diabetes (*n* = 23)	Pregestational diabetes (*n* = 20)	Diagnosed preterm labor (*n* = 48)	Risk for preterm labor (*n* = 44)	Chronic hypertension (*n* = 36)	Totals
< 8	Abdominal wound infection	7	5	0	0	1	13
	Other *	2	0	2	1	4	9
	Blood pressure check	0	0	0	0	8	8
	Episiotomy complication	0	5	0	0	0	5
	Cesarean - related problems	1	0	1	0	0	2
	Vaginal discharge, lochia problems	0	0	1	0	1	2
	Musculoskeletal problems	1	0	0	0	1	2
	Milk duct problems	1	0	0	0	0	1
	Blood sugar check	0	1	0	0	0	1
	Postpartum hemorrhage	0	0	0	0	1	1
	S/p trauma	1	0	0	0	0	1
	Sexually transmitted disease	1	0	0	0	0	1
	Cold, flu	0	0	0	0	1	1
8 – 16	Other *	1	1	4	2	5	13
	Sexually transmitted disease	0	0	3	0	0	3
	Blood pressure check	0	0	0	0	2	2
	Vaginal discharge, lochia problems	0	0	1	0	0	1
	Abdominal wound infection	0	1	0	0	0	1
	Postpartum hemorrhage	0	0	0	0	1	1
	Headache, migraine	0	0	0	0	1	1
16 – 24	Other *	0	0	2	1	6	9
	Subsequent pregnancy problem	0	0	2	0	0	2
	Cold, flu	0	0	1	0	1	2
	Urinary tract infection, pyelonephritis	0	0	1	0	0	1
	Sexually transmitted disease	0	0	1	0	0	1
	S/p trauma	1	0	0	0	0	1
	Headache, migraine	0	0	0	0	1	1

Weeks postpartum	Reason	Gestational diabetes (*n* = 23)	Pregestational diabetes (*n* = 20)	Diagnosed preterm labor (*n* = 48)	Risk for preterm labor (*n* = 44)	Chronic hypertension (*n* = 36)	Totals
24 – 52	Other *	5	3	2	4	8	22
	Subsequent pregnancy problem	0	0	4	0	0	4
	S/p trauma	1	0	1	1	0	3
	Vaginal discharge, lochia problems	0	1	0	1	0	2
	Urinary tract infection, pyelonephritis	0	0	2	0	0	2
	Blood sugar check	1	0	0	0	0	1
	Headache, migraine	0	0	1	0	0	1
	Musculoskeletal problem	0	0	1	0	0	1

* Included common medical conditions, e.g., otitis media, gastritis, hives, etc.

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