



Postpartum Severe Maternal Morbidity Among Mothers of Neonatal Intensive Care Unit Infants

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Abstract

Introduction: To reduce maternal mortality, it is critical to identify women at increased risk of postpartum complications.

Methods: We conducted a retrospective cohort study of mothers delivering liveborn infants at North Carolina Women's Hospital between 7/1/2014 and 6/30/2016. NICU mothers were defined as women with ≥ 1 infant admitted to the Neonatal Critical Care Unit. We used data from the UNC Health System Epic Electronic Medical Record to ascertain hospital visits between discharge and 12 weeks postpartum. We used Alliance for Innovation on Maternal Health (AIM) criteria to define postpartum severe maternal morbidity (PSMM). We used Fisher's exact tests to compare rates of PSMM among mothers of well babies (MWB), compared with NICU mothers.

Results: Among 6849 women in our cohort, there were 488 emergency department visits, 239 OB triage visits, 62 hospitalizations for observation, and 171 inpatient admissions at the North Carolina Women's Hospital within the first 12 weeks postpartum. There were no postpartum maternal deaths. NICU mothers were more likely to have at least one hospital visit than MWB (173/1081, 15.6% vs. 517/5768, 9.0%, $p < .0001$). PSMM by AIM criteria was experienced by 33/6849 women (0.48%). NICU mothers were more likely to experience SMM than MWB (1.2% vs. 0.38%, Fisher's Exact $p = 0.01$, OR 2.69, 95% CI 1.30-5.56).

Conclusion: About 0.5% of mothers were readmitted with PSMM. Actual rates of PSMM are likely higher, as we only ascertained encounters within the UNC Health System. The risk of PSMM was higher among NICU mothers than among mothers of well babies.

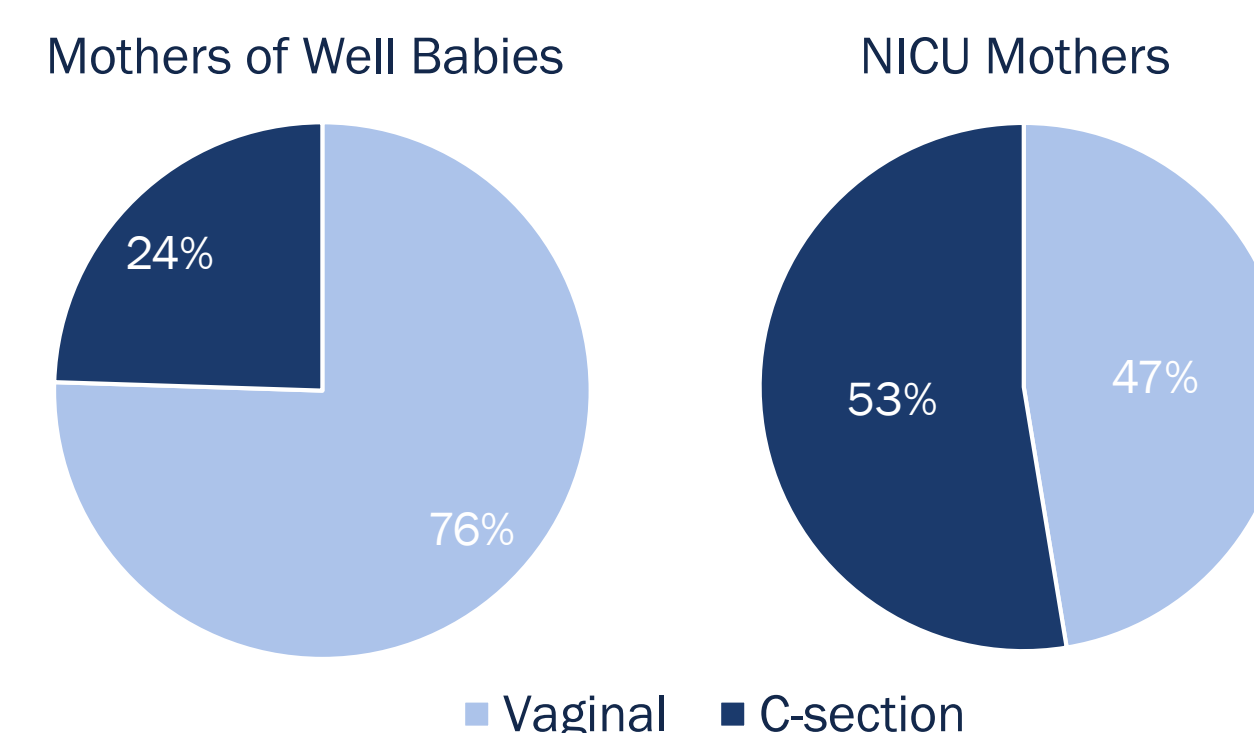
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Methods

- We conducted a retrospective cohort study of mothers of liveborn infants delivered at North Carolina Women's Hospital between July 1, 2014 and June 30, 2016.
- We defined mothers of well babies (MWB) as mothers of infants who were not admitted to an intensive care unit and were discharged to home.
- Outcomes were ascertained from the UNC Perinatal Database and the Carolina Data Warehouse for Health, which includes data from the Epic@UNC electronic medical record (EMR).
- For postpartum readmissions, we analyzed final coded diagnoses using Alliance for Innovation on Maternal Health (AIM) criteria to define postpartum severe maternal morbidity (PSMM).
- We used chi square tests to compare sociodemographic characteristics and obstetric complications among MWB vs. NICU mothers, and we used Fisher's Exact tests to compare rates of postpartum severe maternal morbidity.

Results

More than half of NICU mothers birthed by c-section



Results

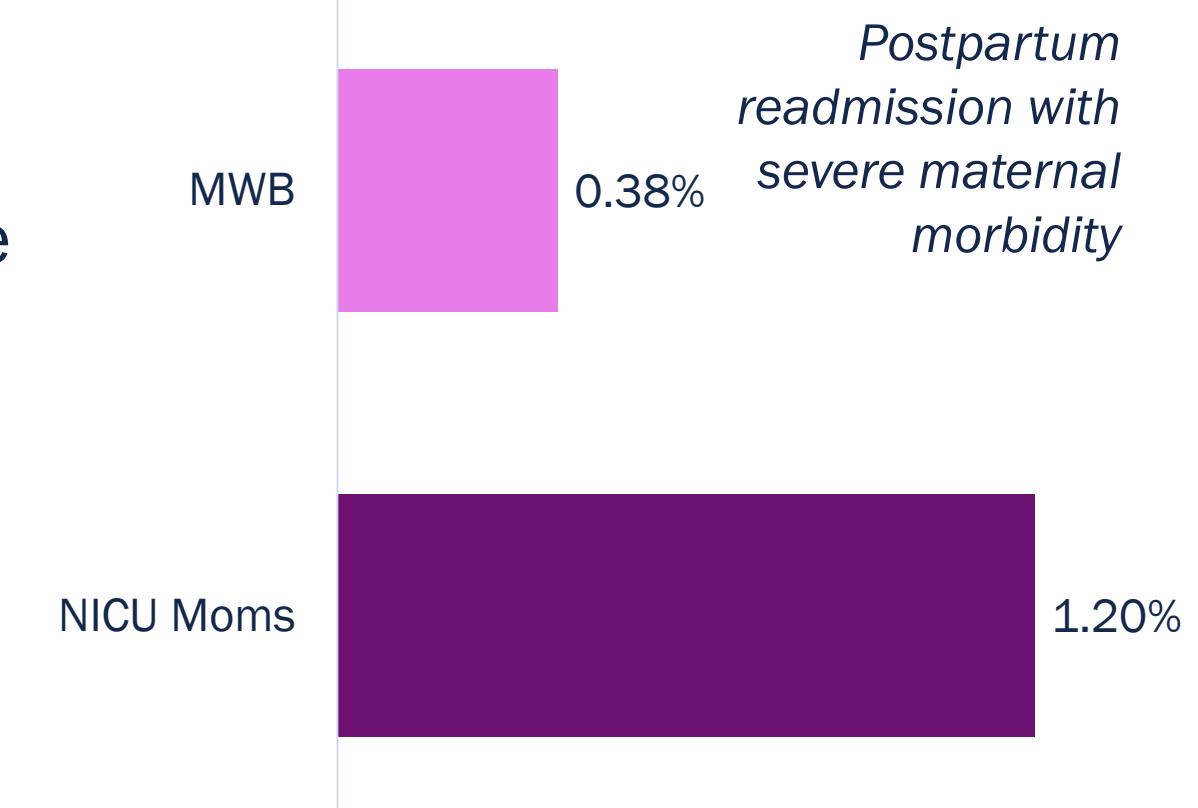
Characteristics and Perinatal Complications

	Total		MWB never in NICU		Mothers of infants in NICU		p-value*
	N	%	N	%	N	%	
Age at Delivery							0.189
<20	306	4.5	254	4.4	52	4.8	
20-34	4977	72.7	4216	73.1	761	70.4	
≥ 35	1566	22.9	1298	22.5	268	24.8	
Race/Ethnicity							<0.01
White	3049	44.5	2551	44.2	498	46.1	
Black	1197	17.5	929	16.1	268	24.8	
Asian/Pacific Islander	308	4.5	291	5.1	17	1.6	
Hispanic	1736	25.4	1546	26.8	190	17.6	
Other	559	8.2	451	7.8	108	10.0	
Marital status							0.098
Single	2956	45.2	2476	44.8	480	47.6	
Married/Partnered	3579	54.8	3051	55.2	528	52.4	
Primary language							<0.01
English	5413	79.0	4485	77.8	928	85.9	
Spanish	1185	17.3	1064	18.5	121	11.2	
Other/Unknown/Missing	251	3.7	219	3.8	32	3.0	
Insurance at Delivery							<0.01
Private	3133	45.7	2676	46.4	457	42.3	
Public	3358	49.0	2810	48.7	548	50.7	
Military	225	3.3	163	2.8	62	5.7	
Self or Unknown	133	1.9	119	2.1	14	1.3	
Body Mass Index							<0.01
Underweight	180	3.1	145	2.9	35	3.9	
Normal weight	2,660	45.1	2339	46.8	321	35.6	
Overweight	1,495	25.3	1257	25.1	238	26.4	
Obese	1,568	26.6	1261	25.2	307	34.1	
Diabetes							<0.01
Pre-gestational	183	2.7	94	1.6	89	8.2	<0.01
Gestational	497	7.3	387	6.7	110	10.2	<0.01
Hypertension							<0.01
Chronic	463	6.8	297	5.2	166	15.4	<0.01
Gestational	703	10.3	536	9.3	167	15.5	<0.01
Mild Preeclampsia	197	2.9	160	2.8	37	3.4	0.24
Severe Preeclampsia	354	5.2	148	2.6	206	19.1	<0.01
Eclampsia	<10	0.1	<10	0.0	<10	0.2	0.06
HELLP Syndrome	42	0.6	12	0.2	30	2.8	<0.01
Peripartum Complications							<0.01
General Anesthesia	135	2.0	52	0.9	83	7.7	<0.01
Hysterectomy	18	0.3	<10	0.1	14	1.3	<0.01
Postpartum Hemorrhage	477	7.0	361	6.3	116	10.7	<0.01
Blood Transfusion	185	2.7	128	2.2	57	5.3	<0.01
FFP Transfusion	27	0.4	16	0.3	11	1.0	<0.01
Severe Maternal Morbidity	208	3.0	132	2.3	76	7.0	<0.01

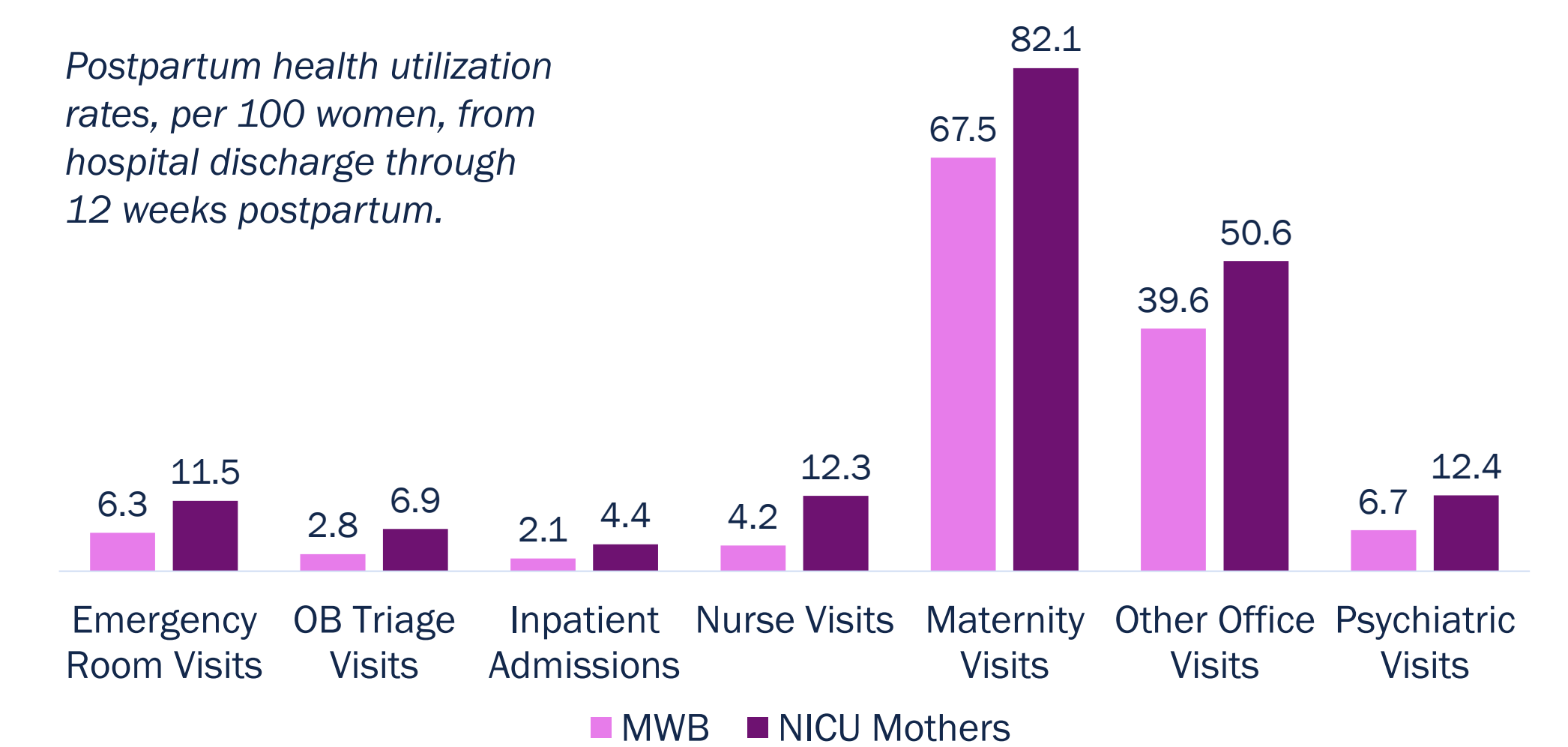
Results

Postpartum Severe Maternal Morbidity and Utilization

NICU mothers were 2.7 times as likely to be readmitted after discharge with postpartum severe maternal morbidity, and were more likely to utilize both emergency- and office-based health services.



Postpartum health utilization rates, per 100 women, from hospital discharge through 12 weeks postpartum.



Conclusions

- Mothers of infants admitted to the NICU are a high risk population, with greater chronic disease burden, more peripartum complications, and more postpartum severe maternal morbidity than mothers of well babies.
- Embedding care for mothers within NICU settings may reduce maternal morbidity and mortality and improve outcomes.

