



Perinatal Morbidity among Mothers of Medically Fragile Infants

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BACKGROUND

Mothers of medically fragile infants (MMFI) must recover from birth while attending to an infant in the neonatal intensive care unit (NICU). We hypothesized that, compared with mothers of well babies (MWB), MMFI would have more chronic medical problems and obstetric complications, increasing their follow-up needs.

OBJECTIVE

- We sought to quantify the burden of chronic disease and perinatal morbidity among mothers of medically fragile infants, compared with mothers of well babies.
- These findings will inform new clinical strategies for addressing the postpartum health needs of MMFI.

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 MWB as mothers of infants who were not admitted to an intensive care unit and were discharged to home.
- We defined MMFI as mothers of infants with a total neonatal intensive care unit and pediatric critical care unit length of stay ≥ 3 days.
- We defined mothers of transiently ill infants (MTII) as mothers of infants with a total neonatal intensive care unit and pediatric critical care unit length of stay < 3 days.
- 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.
- We used chi square tests to compare health status and perinatal complications among MMFI, MTII, and MWB. P values less than .05 were considered statistically significant.

RESULTS

Sociodemographic characteristics

	All	MWB	MTII	MMFI	p-value*
		Never in NICU, d/c to home	in NICU < 3 days	in NICU ≥ 3 days	
N	6851	5769	338	744	
Age at Delivery, %					0.44
<20	4.5	4.4	4.7	4.8	
20-34	72.7	73.1	69.2	71.0	
≥ 35	22.8	22.5	26.0	24.2	
Race/Ethnicity, %					0.0001
Non-Hispanic White	44.5	44.3	41.4	48.1	
Non-Hispanic Black	17.5	16.1	22.8	25.8	
Asian/Pacific Islander	4.5	5.0	3.0	0.9	
Hispanic	25.3	26.7	22.5	15.3	
American Indian/Alaska Native	0.3	0.3	0.6	0.3	
Other/Missing/Refused	7.9	7.6	9.8	9.5	
Marital Status, %					0.32
Single	43.0	42.5	45.9	45.6	
Married/Partnered	55.5	55.9	52.4	53.4	
Divorced/Widowed/Separated	1.6	1.6	1.7	1.0	
Primary Language, %					0.0001
English	80.3	79.0	83.8	89.0	
Spanish	17.5	18.7	14.4	10.0	
Other	2.2	2.3	1.8	1.0	
Insurance Type (at Delivery), %					0.0001
Private	48.7	49.5	43.2	44.5	
Medicaid	47.4	47.1	52.7	47.0	
Medicare	0.8	0.6	0.9	1.9	
Tricare	3.2	2.7	3.3	6.6	

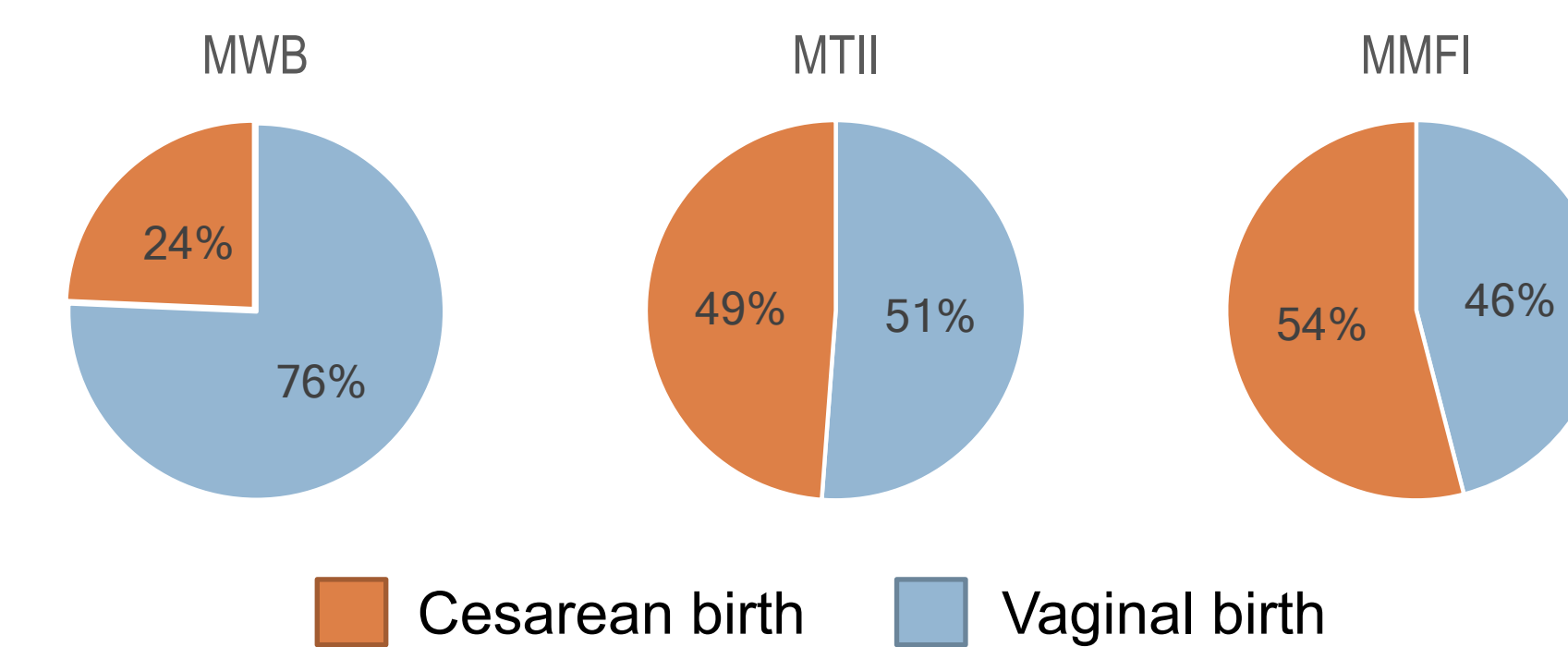
Obstetric history and birth complications

	All	MWB	MTII	MMFI	p-value*
		Never in NICU, d/c to home	in NICU < 3 days	in NICU ≥ 3 days	
Multiple Gestations, %	3.0	1.5	5.6	13.7	0.0001
Parity after Delivery, %					0.0001
1	38.3	37.2	44.1	44.2	
2	31.1	32.0	27.5	25.8	
3	17.5	18.0	13.9	15.2	
≥ 4	13.2	12.9	14.5	14.8	
Gestational Age at Delivery, %					0.0001
<32 weeks	3.4	0.0	3.3	29.8	
32-36 weeks	9.2	3.6	24.9	45.2	
≥ 37 weeks	87.4	96.4	71.9	25.0	
Perineal Laceration, %					0.0001
1st or 2nd Degree	36.6	40.0	23.4	16.1	0.0001
3rd or 4th Degree	1.8	1.9	2.4	0.5	0.02
General Anesthesia, %	2.0	0.9	5.6	8.6	0.0001
Cesarean Section, %	28.8	24.3	48.8	54.0	0.0001
Hysterectomy, %	0.3	0.1	0.6	1.6	0.0001
Postpartum Hemorrhage, %	7.0	6.3	8.9	11.6	0.0001
Blood Transfusion, %	2.7	2.2	4.4	5.7	0.0001
FFP Transfusion, %	0.4	0.3	0.9	1.1	0.002

% = column percent. *p-value from the Pearson chi-square test. Missing not calculated in percents.

RESULTS

54% of MMFI delivered via cesarean section, compared with 49% of MTII and 24% of MWB



MMFI were also more likely to undergo general anesthesia for delivery (8.6% vs. 5.6% for MTII and 0.9% for MWB), more likely to undergo hysterectomy (1.6% vs. 0.6% and 0.1%) and more likely to have a blood transfusion (5.7% vs. 4.4% and 2.2%).

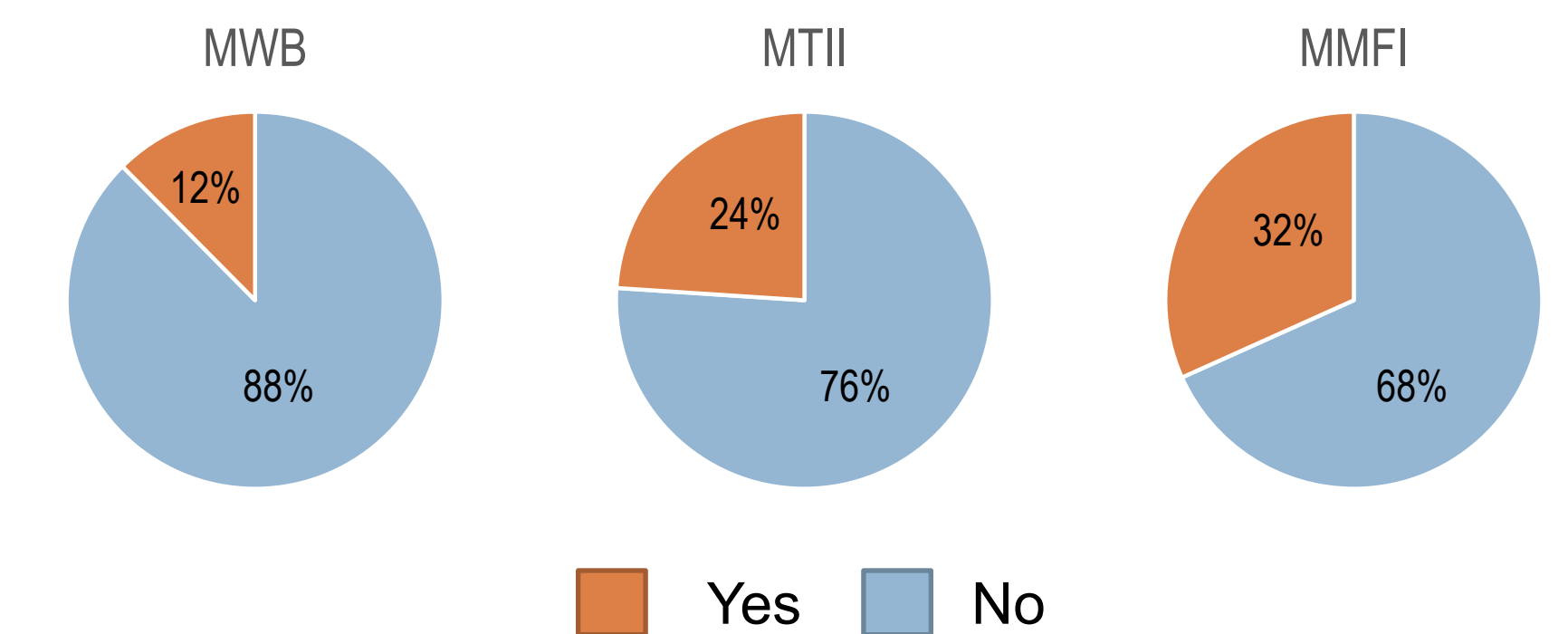
Chronic Disease Burden

	All	MWB	MTII	MMFI	p-value*
		Never in NICU, d/c to home	in NICU < 3 days	in NICU ≥ 3 days	
Body Mass Index, %					0.0001
Underweight	3.1	2.9	2.8	4.4	
Normal weight	45.1	46.8	35.4	35.7	
Overweight	25.3	25.1	29.1	25.3	
Obese	26.5	25.2	32.6	34.7	
Diabetes, %					0.0001
Pre-gestational	2.7	1.7	11.5	6.7	0.0001
Gestational	7.3	6.7	10.7	10.0	0.0001
Hypertension, %					0.0001
Chronic Hypertension	6.8	5.2	11.5	17.1	0.0001
Gestational Hypertension	10.3	9.3	17.5	14.5	0.0001
Mild Preeclampsia	2.9	2.8	3.3	3.5	0.49
Severe Preeclampsia	5.2	2.6	9.8	23.3	0.0001
Eclampsia	0.1	0.0	0.0	0.3	0.041
HELLP Syndrome	0.6	0.2	1.2	3.5	0.0001
Blood Pressure Check Indicated					0.0001
7-10 days Postpartum	15.1	12.4	24.0	31.7	0.0001
Bipolar Disorder, %	1.9	1.8	3.0	3.0	0.03

MMFI were more likely than MWB to have a BMI > 30 and to have cHTN or severe preeclampsia. MTII had a higher prevalence of diabetes (11.5% pre-gestational, 11.7% GDM), compared with MMFI (6.7%, 10.0%) and MWB (1.7%, 6.7%).

RESULTS

Hypertensive Complications



31.7% of MMFI had gestational hypertension or preeclampsia, and thus had an indication for a blood pressure check at 7 to 10 days postpartum.

CONCLUSIONS

- MMFI have a greater burden of chronic disease and perinatal morbidity than MWB.
- More than half of MMFI are recovering from a cesarean section while attending to the needs of their critically ill infant. They may require additional support for pain control and wound care.
- Almost a third of MMFI experience a hypertensive complication of pregnancy, and require follow-up at 7-10 days postpartum. Arranging this follow-up in the NICU could reduce burden for mothers.
- Innovative approaches are needed to meet the needs of MMFI in the postpartum period.

FUNDING

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