



Postpartum health service utilization by mothers of infants admitted to neonatal intensive care

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Abstract

Objective: Mothers of infants admitted to the neonatal intensive care unit (NICU) must recover from birth while attending to a critically ill infant. These mothers also have higher rates of chronic disease and perinatal complications than mothers of well babies (MWB). We sought to quantify postpartum health utilization by NICU mothers, compared with MWB.

Study Design: 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. MWB were defined as mothers of infants not admitted to the NICU. NICU mothers were defined as mothers with one or more infants admitted to the NICU. We further subtyped NICU mothers into two groups: Mothers of medically fragile infants (MMFI), defined as NICU length of stay ≥ 3 days, and mothers of transiently ill infants (MTII), defined as NICU stays < 3 days. We ascertained postpartum health service utilization through encounter data recorded in the UNC Health System Epic Electronic Medical Record (EMR) between discharge from the birth hospitalization and 12 weeks postpartum. We used Poisson regression to compare encounter counts by encounter type, adjusting for mode of delivery, race/ethnicity, payer status, and maternal age. When differences were found between NICU mothers and MWB, we further compared utilization for MMFI vs. MTII.

Results: During the study period, 6849 mothers met criteria for inclusion, of whom 5768 were MWB, 743 were MMFI, and 338 were MTII. Of these 6849 women, 4349 had at least one encounter in the UNC system during the 12-week postpartum period, comprising 9540 encounters. In crude analyses, NICU mothers were more likely to experience each type of encounter, compared with MWB (Table). In adjusted analyses, utilization rates remained significantly higher for NICU mothers for all encounter types other than emergency room visits. Exclusion of women without any postpartum encounters in the UNC Health System did not materially change our results. When we compared MTII with MMFI, we found that MTII had higher rates of outpatient office visits (adj RR 1.29, 95% CI 1.07-1.55) and psychiatry visits (adj RR 1.63, 95% CI 1.13-2.35).

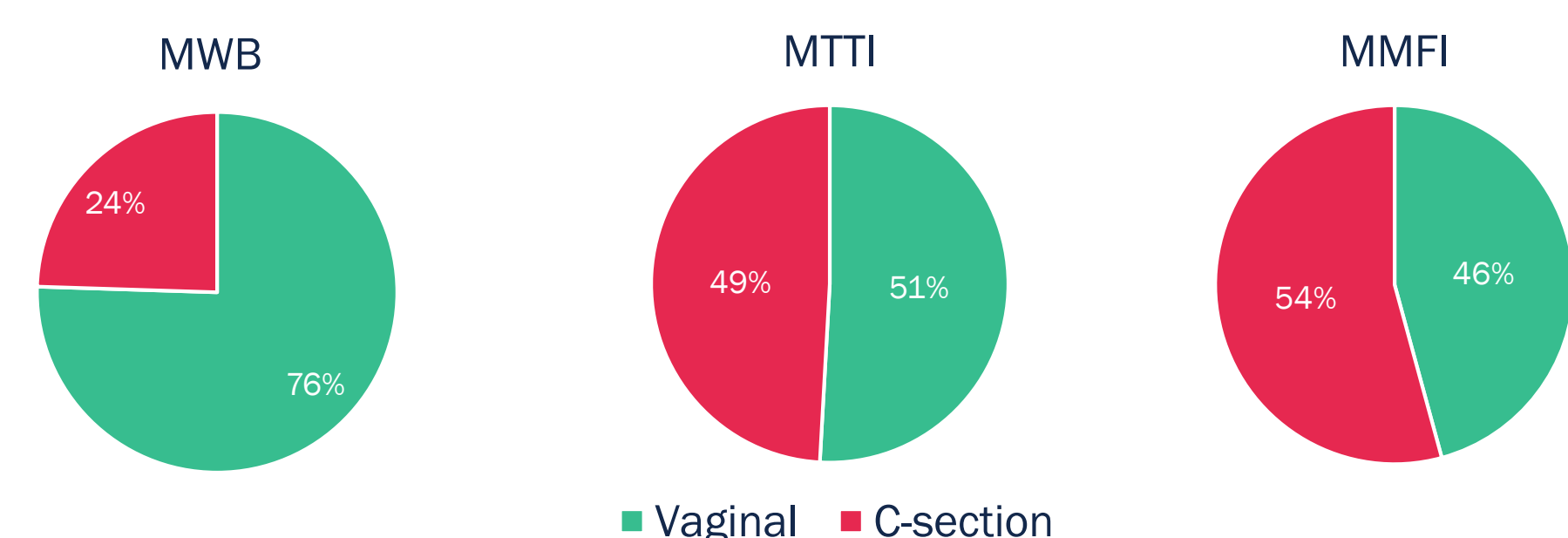
Conclusion: Mothers of NICU infants utilize health care at a higher rate in the postpartum period, compared with MWB.

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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.
- 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 (EMR).
- We used Poisson regression to compare encounter counts by encounter type, adjusting for mode of delivery, race/ethnicity, payer status, and maternal age.

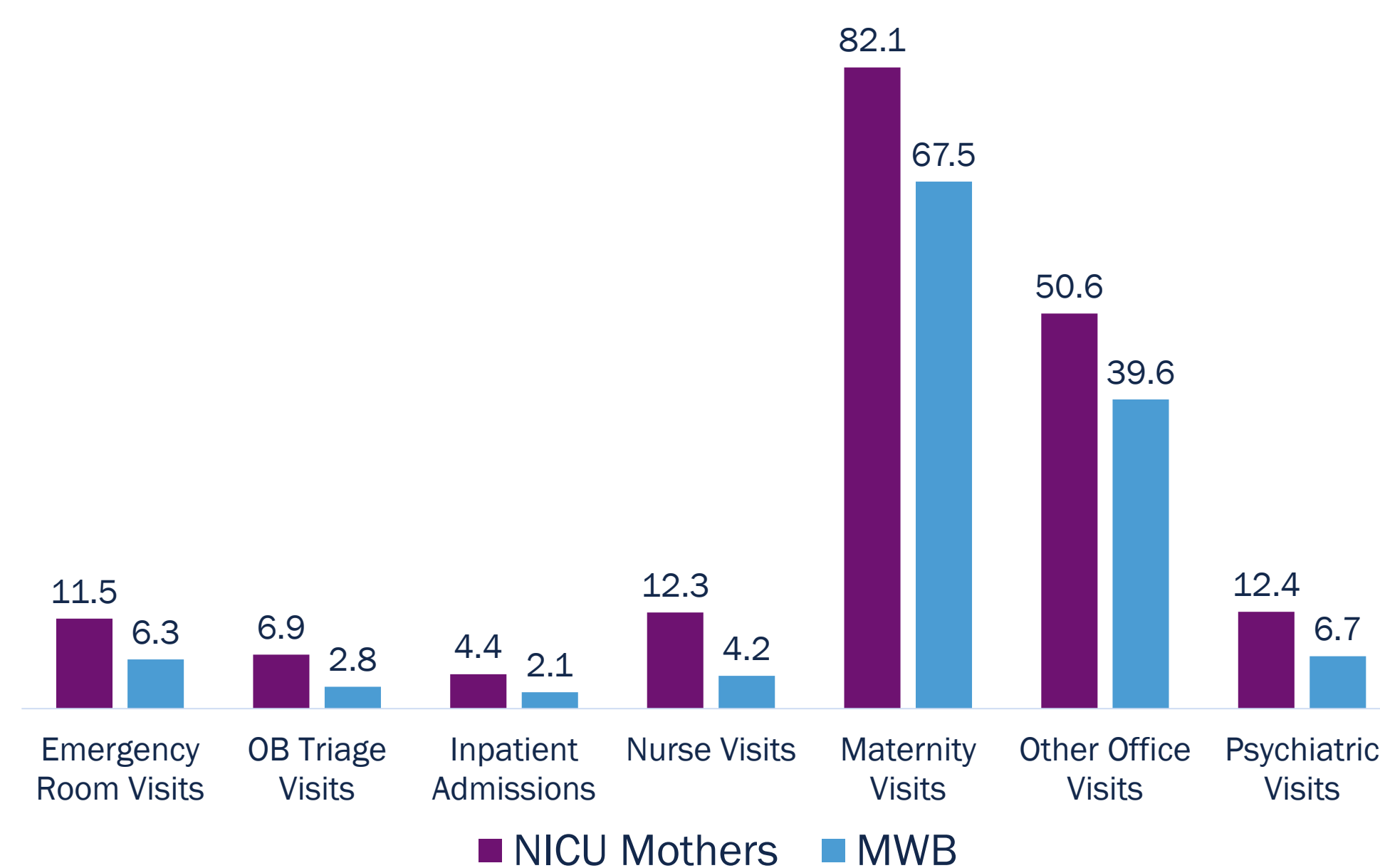
More than half of NICU mothers birthed by c-section



Results

	MWB never in NICU		MTII in NICU < 3 days		MMFI in NICU > 3 days		p-value*
	N	%	N	%	N	%	
Age at Delivery							0.44
<20	254	4.4	16	4.7	36	4.9	
20-34	4216	73.1	234	69.2	527	70.9	
>35	1298	22.5	88	26.0	180	24.2	
Race/Ethnicity							0.0001
Non-Hispanic White	2551	44.2	140	41.4	358	48.2	
Non-Hispanic Black	929	16.1	77	22.8	191	25.7	
Asian/Pacific Islander	291	5.1	10	3.0	7	0.9	
Hispanic	1546	26.8	76	22.5	114	15.3	
Other	451	7.8	35	10.4	73	9.8	
Multiple Gestations	83	1.4	19	5.6	102	13.7	0.0001
Parity after Delivery							0.0001
1	2145	37.2	149	44.1	329	44.3	
2	1843	32.0	93	27.5	191	25.7	
3	1036	18.0	47	13.9	113	15.2	
> 4	744	12.9	49	14.5	110	14.8	
Mode of Delivery							0.0001
Vaginal Delivery	4148	71.9	148	43.8	325	43.7	
Operative Vaginal Delivery	207	3.6	24	7.1	15	2.0	
Cesarean Section	1413	24.5	166	49.1	403	54.2	

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



Results

Visit Type	MWB, utilization rate per 100 (95% CI)	NICU Mothers, utilization rate per 100 (95% CI)	Rate ratio, adjusted* (95% CI)
Emergency Room Visits	6.3 (5.7 - 7.0)	11.5 (9.6 - 13.7)	1.21 (0.95 - 1.54)
OB Triage Visits	2.8 (2.4 - 3.3)	6.9 (5.5 - 8.7)	1.62 (1.18 - 2.20)
Inpatient Admissions	2.1 (1.8 - 2.5)	4.4 (3.3 - 5.9)	2.00 (1.36 - 2.95)
Nurse Visits	4.2 (3.7 - 4.8)	12.3 (10.4 - 14.6)	2.29 (1.82 - 2.89)
Maternity Visits	67.5 (65.4 - 69.7)	82.1 (76.8 - 87.6)	1.14 (1.06 - 1.24)
Other Office Visits	39.6 (38.1 - 41.3)	50.6 (46.5 - 55.0)	1.18 (1.07 - 1.31)
Psychiatric Visits	6.7 (6.0 - 7.4)	12.4 (10.5 - 14.7)	1.79 (1.44 - 2.22)

* Adjusted for race/ethnicity, payer status, maternal age and mode of delivery

Conclusions

- Mothers of infants admitted to the NICU had higher rates of postpartum health care utilization.
- Utilization rates were higher for acute care in the emergency department and OB Triage, as well as in outpatient settings.
- These differences in postpartum utilization persisted with adjustment for race/ethnicity, payer status, maternal age, and mode of delivery.
- Mothers of infants admitted to the NICU are a high risk population that may benefit from additional support and care coordination.
- Embedding care for mothers within NICU settings may improve outcomes for families.

