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Racial disparities in breastfeeding rates in patients with heart disease

--Manuscript Draft--

Manuscript Number:	REHD-D-23-00823
Full Title:	Racial disparities in breastfeeding rates in patients with heart disease
Article Type:	Original Paper
Abstract:	Objective: To evaluate racial disparities in breastfeeding rates in patients with heart disease. Study Design: Retrospective cohort of pregnant patients with maternal cardiac disease managed by a Cardio-Obstetrics program. Patients self-identifying as Non-Hispanic Black (NHB) and Non-Hispanic White (NHW), who attended ≥ 1 prenatal visit at the Cardio-Obstetrics Program and delivered at the same hospital between March 2015 and June 2019 were included. The primary outcome was breastfeeding rate at discharge from the delivery-associated hospitalization. Secondary outcomes included breastfeeding intent on admission and breastfeeding rates at the postpartum visit among patients who initiated breastfeeding. Results: 138 pregnant patients with cardiac disease were included: 58 (42%) NHB and 80 (58%) NHW patients. Parity, marital status and insurance were statistically different between groups. NHB patients were more likely to have government insurance compared to NHW patients (77.6% vs. 40%; p<0.001). There was a significant difference in the intent to breastfeed upon admission for the delivery-associated hospitalization (74.2% NHB vs NHW 91.3%; p=0.01), but not at hospital discharge (84.5% NHB vs. 93.8% NHW; p=0.08). However, breastfeeding rates were significantly lower among NHB patients at the postpartum visit among the entire cohort (38.2% in NHB vs. 61.1% in NHW women; p=0.036) and among those who initiated breastfeeding (35.3 % NHB vs 61.1% NHW, p=0.018). Conclusions: Despite similar breastfeeding rates at hospital discharge, NHB patients with maternal cardiac disease were less likely to intend and/or continue breastfeeding by the postpartum visits. Qualitative studies understanding these differences are crucial to improve breastfeeding rates, especially for NHB patients with maternal cardiac disease.

Racial disparities in breastfeeding rates in patients with heart disease

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Abstract

Objective: To evaluate racial disparities in breastfeeding rates in patients with heart disease.

Study Design: Retrospective cohort of pregnant patients with maternal cardiac disease managed by a Cardio-Obstetrics program. Patients self-identifying as Non-Hispanic Black (NHB) and Non-Hispanic White (NHW), who attended ≥ 1 prenatal visit at the Cardio-Obstetrics Program and delivered at the same hospital between March 2015 and June 2019 were included. The primary outcome was breastfeeding rate at discharge from the delivery-associated hospitalization. Secondary outcomes included breastfeeding intent on admission and breastfeeding rates at the postpartum visit among patients who initiated breastfeeding.

Results: 138 pregnant patients with cardiac disease were included: 58 (42%) NHB and 80 (58%) NHW patients. Parity, marital status and insurance were statistically different between groups. NHB patients were more likely to have government insurance compared to NHW patients (77.6% vs. 40%; $p<0.001$). There was a significant difference in the intent to breastfeed upon admission for the delivery-associated hospitalization (74.2% NHB vs NHW 91.3%; $p=0.01$), but not at hospital discharge (84.5% NHB vs. 93.8% NHW; $p=0.08$). However, breastfeeding rates were significantly lower among NHB patients at the postpartum visit among the entire cohort (38.2% in NHB vs. 61.1% in NHW women; $p=0.036$) and among those who initiated breastfeeding (35.3 % NHB vs 61.1% NHW, $p=0.018$).

Conclusions: Despite similar breastfeeding rates at hospital discharge, NHB patients with maternal cardiac disease were less likely to intend and/or continue breastfeeding by the postpartum visits. Qualitative studies understanding these differences are crucial to improve breastfeeding rates, especially for NHB patients with maternal cardiac disease.

Introduction

Breastfeeding has many benefits for both mothers and their babies. The U.S. Department of Health and Human Services reported a decreased risk of childhood asthma, ear infections, gastrointestinal issues, sudden infant death syndrome, respiratory infections, and infant mortality in breastfed babies compared to babies who are formula fed [1]–[4]. Mothers who breastfeed also experience a myriad of benefits including weight loss and lower rates of type 2 diabetes, breast cancer, endometrial cancer, hypertension, and hyperlipidemia [1]–[8]. These benefits explain the firmly held recommendation to exclusively breastfeed for 6 months by the American Academy of Pediatrics, the U.S. Department of Health and Human Services, and the Centers for Disease Control (CDC) [1], [9]. However, despite this recommendation, there are documented racial disparities in breastfeeding rates between NHB and NHW women [10].

In patients without heart disease, the rate of exclusive breastfeeding after delivery in one study for the first 3 months in NHB women was 39.1% in NHB women vs. 52.9% in NHW counterparts [10]. Despite benefits of breastfeeding for both mother and baby, U.S. breastfeeding rates among women from all racial/ethnic groups are low compared to the objectives set forth by the U.S. Department of Health and Human Services [1]. NHB women have the lowest rates, and are 2.5 times less likely to breastfeed than NHW women. [2]

As advancements in medical and surgical treatments have occurred over the years, the number of people with congenital heart disease (CHD) living into adulthood has increased [3], [11], [12]. For instance, survival rate in children born with CHD in the 1950s was only about 15%, which has significantly improved to more than 90% today [13]. The estimated prevalence of adults with CHD is approximately 3000 per million people [14], [15]. As a result, the number

of childbearing women with heart disease has increased resulting in more complex pregnancies and an associated increase in morbidity in this patient population [12], [14], [16].

Therefore, the objective of our study was to examine differences in breastfeeding rates between NHB and NHW women in a cardio-obstetrics program. We hypothesized that there is no difference in breastfeeding rates between NHB and NHW women with heart disease at the time of discharge from the delivery-associated hospitalization.

Methods

We conducted a retrospective study of a cohort of pregnant patients with maternal cardiac disease managed by the University of Alabama at Birmingham (UAB) Cardio-Obstetrics Program. The UAB Cardio-Obstetrics Program provides maternal and fetal care services for women with congenital or acquired heart disease. This program is directed by an adult congenital cardiologist and employs a large team including Maternal–Fetal Medicine specialists, cardiologists, pharmacists, obstetric anesthesiologists, and perinatal nurses to provide multidisciplinary care for women with cardiac conditions. Women were included in this study if they attended one or more prenatal visits with the UAB Cardio-Obstetrics Program and delivered at the UAB hospital between March 2015 and June 2019. Women were excluded if their ethnicity was any other than NHB or NHW, if their infant feeding modality was not documented, if they chose adoption, or if they delivered at an outside institution. The UAB institutional review board granted approval for this research study.

Baseline maternal, delivery and neonatal outcomes were abstracted from the medical record by trained health professionals as previously described [17], [18].Additional variables relating to breastfeeding were abstracted by A.R. and A.G.O. Specifically, these included breastfeeding intent at delivery, any breastfeeding at hospital discharge, and any breastfeeding at the postpartum visit. Breastfeeding intent at delivery was defined as self-reported intent to either exclusively or partially breastfeed at admission for the delivery-associated hospitalization. This was abstracted from the history and physical note for the delivery-associated hospitalization. Any breastfeeding at hospital discharge was defined as breastfeeding or expression of breastmilk at discharge from the delivery-associated hospitalization. This variable was abstracted from the mother’s day of discharge progress note from the delivery-associated hospitalization.

Breastfeeding at the postpartum visit was defined as a self-report of breastfeeding or expression of breastmilk at the postpartum visit occurring between 4 – 8 weeks postpartum and abstracted from the postpartum visit note.

The primary outcome was the breastfeeding rate of NHB and NHW women with heart disease at the delivery-associated hospital discharge. Secondary outcomes included breastfeeding intent at admission for delivery and breastfeeding rates in women with heart disease at the postpartum visit.

Statistical analysis

Baseline demographics and study outcomes were compared between NHB and NHW patients using χ^2 tests of association or Fisher's exact tests, as appropriate, for categorical variables. Student's t test and Wilcoxon rank sum tests, as appropriate, were used to evaluate continuous variables. Statistical significance was assessed at a 0.05 level. No adjustments were made for multiple comparisons. All analyses were performed with SAS, version 9.4 (SAS Institute, Cary, NC, USA).

Results

Of 150 identified subjects, 58 (39%) NHB and 80 (53%) NHW patients met inclusion criteria (Figure 1). Table 1 outlines baseline maternal characteristics for both NHB and NHW mothers with maternal cardiac disease. There was no difference noted in maternal age, tobacco smoking, alcohol use, gestational age and mode of delivery or comorbidities. However, parity, insurance and marital status were significantly different between groups (Table 1). The number of children (1.4 vs. 0.7; p=0.003) and public insurance (77.6 vs. 40%; p<0.001) were higher in NHB vs NHW patients. While not statistically significant, it should also be noted that NICU admissions were higher among NHB as compared to NHW patients (29.3% vs. 16.3%, p = 0.07)

There was a significant difference between NHB and NHW women's' intent to breastfeed at admission for delivery (Table 1). At the time of admission, less than half (46.6%) of NHB women planned to exclusively breastfeed, which was considerably less than the 72.5% of NHW women who intended to do so (p=0.01). When considering any intent to breastfeed on admission for their delivery-associated hospitalization, 74.2% of NHB vs. 91.3% of NHW patients planned to either partially or exclusively breastfeed. This discrepancy was slightly less notable for the rates of breastfeeding at the time of discharge from the delivery-associated hospitalization. When looking at the rate of any breastfeeding at the time of discharge from the delivery-associated hospitalization, 84% of the women were NHB compared to 94% NHW (p=0.08), although this was not statistically significant. Out of the total cohort of 58 NHB and 80 NHW, only 34 NHB and 54 NHW attended their postpartum visit, as displayed in Figure 1. Among those who followed up, rates of breastfeeding were NHB 35.3% vs. NHW 61.1% (p=0.018).

Discussion

In women with heart disease, significantly more NHW women intended to breastfeed compared to their NHB counterparts at the time of admission for delivery. At the time of discharge from the delivery-associated hospitalization, there was no difference between breastfeeding rates. However, twice as many NHW women were still breastfeeding at time of the postpartum visit as compared to NHB women.

These disparities are consistent with populations of women without maternal cardiac disease as fewer women self-identifying as NHB breastfeed [19]. Beauregard et al. found that the differences amongst breastfeeding rates in NHB and NHW women were 14.7% for any breastfeeding and 17% for exclusive breastfeeding at 3 months postpartum. This persisted even at 6 months postpartum with a difference of 17.3% for any breastfeeding and 12.4% for exclusive breastfeeding at 6 months postpartum in NHW and NHB women respectively [19]. Another long-term study by Anstey et al. evaluated breastfeeding initiation and duration amongst infants born between 2010 – 2013. This study also exhibited a divergence between NHB and NHW women with 17.2% fewer NHB women initiating breastfeeding and 8.5% fewer NHB women exclusively breastfeeding at 6 months [20].

There are several theories that may explain this disparity including working conditions, partner support, and insurance coverage. According to the U.S. Bureau of Labor Statistics, NHB women comprise 60% of the workforce, the highest rates among adult women when all races compared [21]. NHB women are also less likely to be married to or living with their partner. Supporting a single income household as their family's sole breadwinner makes their return to work critical, consequently shortening their maternity leave [22]. However, this return to work is

often met with resource limitations for breastfeeding hindering their continuation in the postpartum period.

Consistent with limited resources, a majority of NHB women in our cohort were supported through public programs such as Medicaid, which despite having preventive services and resources for breastfeeding education, lactation consultations, and supplies to express breastmilk for infants not directly latching, these benefits are not available for most people in states that did not expand Medicaid. The Patient Protection and Affordable Care Act was amended in 2010 to require employers to provide women who were breastfeeding "reasonable break time" to pump and properly store the mother's milk. However, breastfeeding mothers still experience discrimination in the workplace, receiving negative stigma from coworkers and supervisors that discourages nursing [22]. Taken together, cumulatively these items and discrimination could explain the discrepancy between NHB women who intended to breastfeed at admission, breastfed at delivery-associated hospital discharge, but stopped breastfeeding at their post-partum visit. It should also be noted that while not statistically significant, NHB infants were born approximately one week earlier than NHB babies and had a higher frequency of NICU admissions. Breastfeeding challenges among infants in the NICU have been well described and this could also contribute to some of our findings.

Other studies also reveal breastfeeding racial divergence in the background of chronic disease. Kachoria et al. studied a cohort of women with diabetes and found that breastfeeding initiation rates vary by diabetes status and race. Women with pre-pregnancy diabetes had lower breastfeeding initiation rates and NHB women with pregestational diabetes had the lowest breastfeeding initiation rates overall [23]. A study by Stevens et al. also showed a substantial difference in breastfeeding initiation between NHB and NHW women in a population of women

with maternal diabetes, with NHB mothers least likely to breastfeed [24]. Another study by Morrow et al. identified differences between NHB and NHW women with chronic hypertension. At the time of admission for delivery in this population, women reporting NHB status were less likely to breastfeed at the postpartum visit, compared to NHW patients. Their study also followed these women through to 6 months postpartum and noted that this disparity persisted [25].

Our study is unique in that it evaluates an important issue, breastfeeding in the context of health disparities in a unique patient population – patients with the diagnosis of maternal cardiac disease. Additionally, mWHO classification was assigned by a double board-certified adult congenital cardiologist and were similar between groups, eliminating cardiac disease status as the driver of the disparity. Further, all patients are managed via the same protocols, reducing the chance that care or counseling resulted in disparate findings.

This study is not without limitations, however. First, we note that our analysis does not include variables that may influence breastfeeding rates such as highest educational level or socioeconomic status at the census tract level which would be important to further understand the subtlety of differences in disparities within each population. Second, we have a relatively small sample size and may not be powered for certain outcomes. Third, our results and conclusions may not be generalizable to other practices or populations.

Conclusion

Racial disparities in breastfeeding practices are a prominent and concerning issue in today's healthcare system. Our study evaluated racial and health disparities in breastfeeding between NHB and NHW women in the setting of maternal cardiac disease. Our study revealed several key findings, specifically that NHB women with maternal cardiac disease were less likely

to intend to breastfeed, and initiate and/or maintain breastfeeding by the postpartum visit. This study identifies the importance of interventions aimed to support women self-reporting minority status so that they and their infants can realize benefits of breastfeeding.

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Declarations

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Competing Interests
The authors have no relevant financial or non-financial interests to disclose.

Author Contributions
All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Ayamo Oben, Ashton Robinson and Rachel Sinkey. The first draft of the manuscript was written by Ayamo Oben and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Ethics approval
This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Internal Board Review of University of Alabama.

Consent to participate
Informed consent was obtained from all individual participants included in the study.

Consent to publish
The authors affirm that human research participants provided informed consent for publication.

Table 1. Baseline characteristics of patients receiving care in a Cardio-Obstetrics Program

CHARACTERISTIC	NHB (n=58)	NHW (n=80)	p-value
Maternal age (years)	28.4 ± 6.4	26.5 ± 6.2	0.09
Parity	1.4 ± 1.6	0.7 ± 0.8	<0.01
BMI (kg/m^2)	33.4 ± 8.7	31.2 ± 8.4	0.14
Married or living with partner	11 (19.0)	48 (60.8)	<0.01
Insurance status			<0.01
Private	8 (13.8)	47 (58.8)	
Public	45 (77.6)	32 (40.0)	
Other	5 (8.6)	1 (1.3)	
GA at delivery	36.4 ± 3.6	37.4 ± 3.2	0.13
Mode of delivery			0.38
Vaginal	29 (50.0)	46 (57.5)	
Cesarean	29 (50.0)	34 (42.5)	
NICU Admission	17 (29.3)	13 (16.3)	0.07
GHTN/Preeclampsia	14 (24.1)	21 (26.3)	0.78
CHTN	12 (20.7)	9 (11.3)	0.13
DM	5 (8.6)	7 (8.8)	0.98
mWHO Class			
I	5 (8.6)	7 (8.8)	0.98
II	11 (19.0)	22 (27.5)	0.25
II – III	10 (17.2)	20 (25.0)	0.28
III	17 (29.3)	19 (23.8)	0.46
IV	15 (25.9)	12 (15.0)	0.11

NHB = Non-Hispanic Black, NHW = Non-Hispanic White, BMI = body mass index, GA = gestational age, NICU = neonatal intensive care unit, NICU = neonatal intensive care unit GHTN = gestational hypertension, CHTN = chronic hypertension, DM = diabetes mellitus, mWHO = Modified World Health Organization

Table 2. Breastfeeding outcomes in patients receiving care in a Cardio-Obstetrics Program			
OUTCOMES	NHB (n=58)	NHW (n=80)	p-value
BF intent at admission for delivery			0.01
Formula feed	8 (13.8)	3 (3.8)	
Both breast and formula	16 (27.6)	15 (18.8)	
Breastfeed	27 (46.6)	58 (72.5)	
Unknown/Undecided	7 (12.1)	4 (5.0)	
BF rates at hospital discharge	49 (84.5)	75 (93.8)	0.08
BF rates at the postpartum visit	13 (38.2)*	33 (61.1)*	0.04
PP BF rates among those who initiate BF	12 (35.3)*	33 (61.1)*	0.02
BF = Breastfeeding, MCD = Maternal Cardiac Disease, NHB = Non-Hispanic Black, NHW = Non-Hispanic White, PP = Postpartum *Women who attended PP visit, NHB n = 34, NHW n = 54			

Figure 1: Flowchart showing inclusion and exclusion of participants

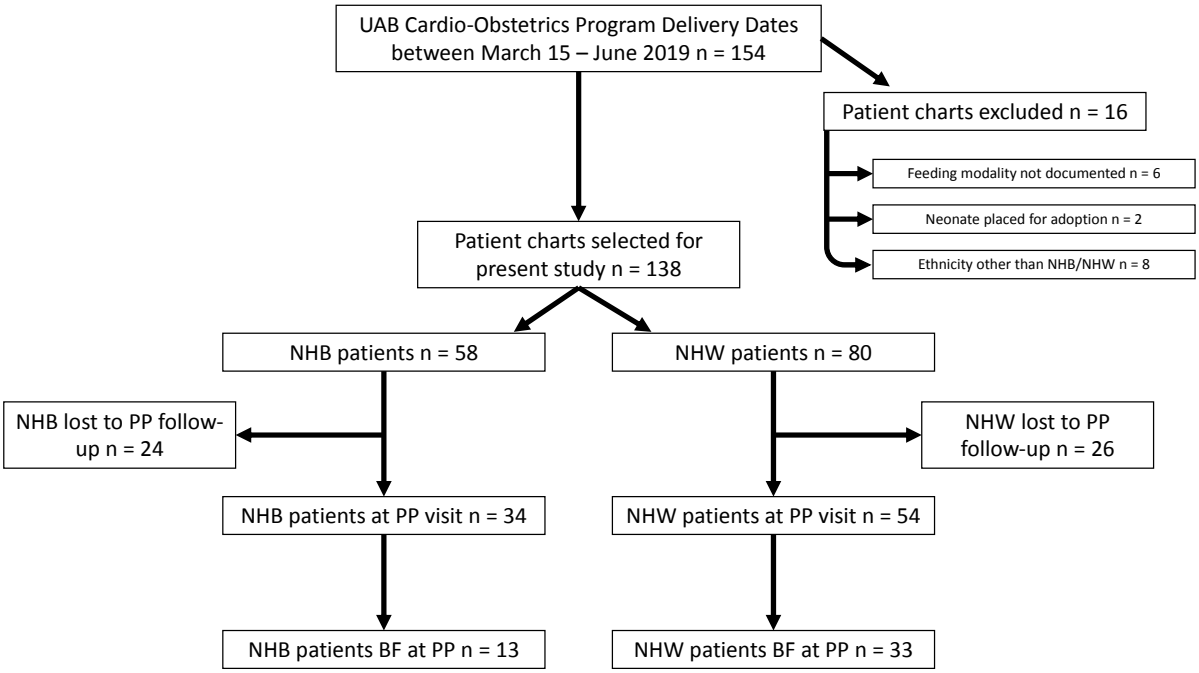
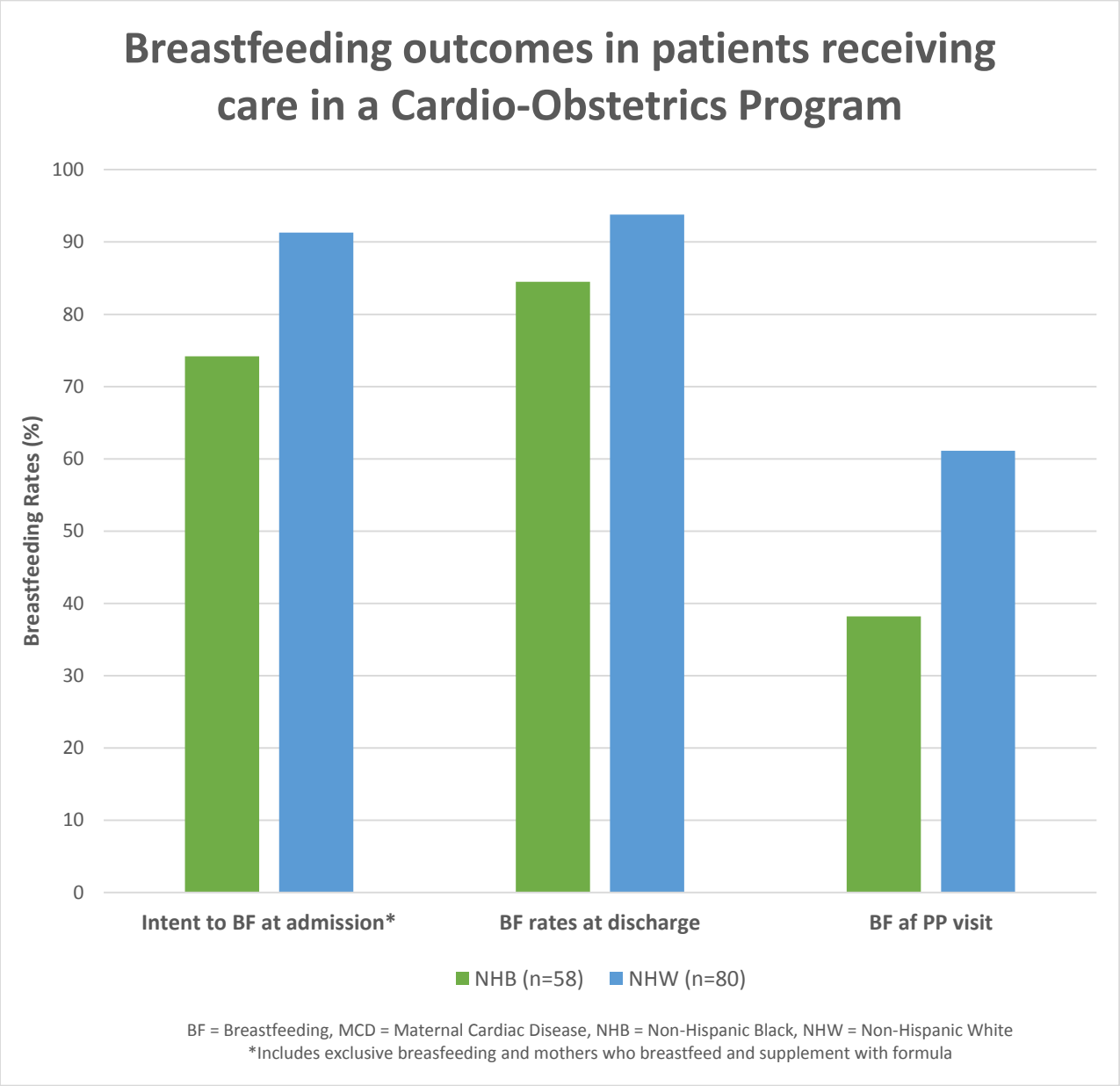


Figure 2:


Breastfeeding outcomes in patients receiving care in a Cardio-Obstetrics Program
Breastfeeding Rates (%)
100
90
80
70
60
50
40
30
20
10
0
Intent to BF at admission*
BF rates at discharge
BF af PP visit
NHB (n=58)
NHW (n=80)
BF = Breastfeeding, MCD = Maternal Cardiac Disease, NHB = Non-Hispanic Black, NHW = Non-Hispanic White
*Includes exclusive breasfeeding and mothers who breastfeed and supplement with formula