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"'Wimpy White Boy Syndrome': Does it Exist in the NICU?"

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ABSTRACT

"Wimpy White Boy Syndrome" (WWBS) is a social phenomenon and belief that exists in the neonatal intensive care unit (NICU), where white boys fare the worst and Black girls fare the best. However, this belief is based on little to no empirical evidence and contradicts the majority of the research that documents Black Americans tend to have worse health outcomes than white Americans. Utilizing electronic medical record data from a Southern, regional, and level IV neonatal intensive care unit, this research project explored racial differences in length of hospital stay, mortality, and resource allocation among low and very low birthweight infants. Using Cox Proportional Hazard Modeling, I find that Black babies have a lower hazard of discharge to home (HR: 0.842; $p<0.001$) and have a slightly higher hazard of mortality (HR:1.561; $p=0.061$) compared to white babies. However, once differences in health are accounted for by controlling for gestational age, respiratory distress, sepsis, and maternal health conditions, Black babies are no longer less likely to discharge (HR: 1.064; $p=0.132$). Additionally, I found that racial differences in time until discharge vary by gender, such that racial differences were more pronounced for boys (HR: 1.155; $p<0.05$ for Black babies and HR: 1.246; $p<0.01$ for other babies). Lastly, I found similar racial differences regarding hospital charges. Black babies have higher hospital charges but controlling for health accounts for these differences. If the concept of "Wimpy White Boy Syndrome" is grounded in racial differences in health, I would find that white male babies would be less likely to be

discharged to home compared to other racial groups and this potential difference should be accounted for by health. However, this research finds that it is only after accounting for health that Black male babies are more likely to be discharged to home compared to white male babies. This finding is discussed in light of the concept of self-fulfilling prophecy, where the providers take actions because of their beliefs about wimpy white boys leading them to be less likely to be discharged, and then the results of those actions confirm their beliefs (Merton 1948).

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INTRODUCTION

Past research has consistently shown that Black Americans have higher infant mortality, lower birth weight, earlier gestational age, and worse health outcomes compared to whites (Chen et al. 2013; Matoba and Collins 2017; Paneth 1995). Despite this documented disparity, an unexplored social phenomenon exists in neonatal intensive care units (NICU) across the country deemed "Wimpy White Boy Syndrome" (Oelberg 2014). "Wimpy White Boy Syndrome" (WWBS) is the theory that white boys fare worse in the NICU than other babies. Included in this theory is a hierarchy of strength – Black female babies are the strongest, then white female babies, then Black male babies, and then the white male babies are the wimpiest. "Wimpy White Boy Syndrome" needs to be researched to determine if its existence is paradoxical to most other research examining racial disparities in health or if it is a non-existent but deeply held belief.

These beliefs, unfounded or not, could result in greater racial disparities if healthcare workers respond to this belief by diverting resources to white babies and away from Black babies. Since research shows that Black infants are far more likely to experience morbidities and higher mortality compared to white infants, it is likely that this trend would be prevalent within the NICU itself (Loggins & Andrade, 2014; Rossen & Schoendorf, 2014; Greenwood et al 2020; Karkoutli et al 2022). Yet, there is limited research within the NICU regarding health disparities that this theory continues to pervade NICU practice. I evaluated this claim by examining health outcomes measured

as discharge and mortality among low birthweight (LBW) and very low birth weight (VLBW) infants in a racially diverse, regional neonatal intensive care unit in the Southeast. I examined whether there are race and gender disparities in health controlling for SES measured as insurance status. Additionally, I inspected the differences in resource allocation by race and gender using hospital charges in this data.

My research questions are: (1) Are there racial differences in discharge, mortality, and resource allocation in low birth weight (LBW) and very low birth weight (VLBW) in the NICU? (2) Does health, as measured by gestational age, respiratory distress, sepsis, and maternal conditions, account for racial differences in discharge or mortality? (2) Do racial differences in discharge, mortality, and resource allocation vary by gender?

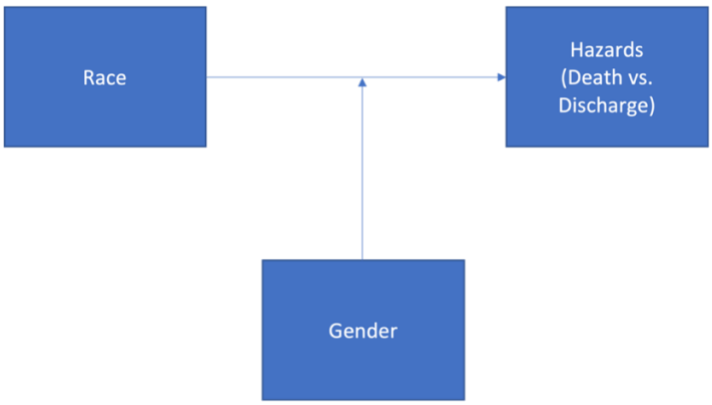

Figure 1 - Conceptual Model

LITERATURE REVIEW OF NEONATAL HEALTH DISPARITIES

"Wimpy White Boy Syndrome" is an anecdotal, commonly held belief in NICU. As many concepts in the medical field, it is a social construct created by nurses, doctors, and other staff working in neonatal intensive care units based on either observation, biases, or some other factor. The belief in WWBS is also found in some non-scientific articles, parent blogs, editorials, Reddit, and magazines (Anon 2022; Abramson 2016; Families.com n.d.; Cantrell 2019; Coleman 2017). While minimal, some research has shown a possible health disadvantage for premature white males (Alexander et al. 1995; Loftin et al. 2012; Morse et al. 2006; Stevenson et al. 2000). The most-cited article by Morse showed survival differences at lower gestational ages, showing Black female babies have a higher survival rate than white males if they have extremely low gestational ages (Morse et al. 2006). This research suggests that racial disparities in mortality and morbidity tend to decrease at earlier gestational age or birthweight. In particular, some research indicates better respiratory outcomes among Black infants. However, even among some of this research, the health advantage for Black babies does not remain long-term or the advantage dissipates with the introduction of advanced interventions (Alexander et al. 1995; Loftin et al. 2012; Stevenson et al. 2000; Frisbie et al. 2004; Howell et al. 2010). The theory may have originated from this research. However, in opposition to the idea of the "Wimpy White Boy Syndrome", there are well-documented, consistent evidence that Black Americans have worse health outcomes than their white peers. Explanations for these health disparities focus on structural aspects such as

systemic racism including segregation, access to care, and culturally incompetent care (Horbar et al. 2019; Ravi, Iacob, and Profit 2021; Profit et al. 2017; Edwards et al. 2021).

Past research has documented mortality disparities among Black and white people that are persistent across the life course, including infancy (Loggins & Andrade 2013; Alexander et al. 2008; Rossen & Schoendorf 2014). The general mortality rate for Black infants is two times that of white infants (Loggins & Andrade 2013). Additionally, this disparity may be increasing. Another study conducted seven years later found that Black newborn babies die at three times the rate of white babies (Greenwood et al 2020). Among, pre-term infants, Black babies disproportionately represent infant deaths. Approximately 70% of the preterm infant deaths are Black babies, despite representing only 20-28% of pre-term infants (Rossen & Schoendorf 2014). Many factors contribute to mortality rates, including but not limited to the mother's health, access to healthcare, and quality of care received.

Racial disparities in health are likely due to many factors including access, segregation, and ethnic variation in the quality of care. Racial and ethnic segregation has been found among NICUs in the United States, such that Black babies tend to receive care from NICUs with lower quality scores and white babies tend to receive care from NICUs with higher quality score. This segregation across NICU units has been found to increase racial disparities in health (Horbar et al. 2019). Specifically in a study conducted in New York City, white babies were born in hospitals with the lowest mortality rates, whereas Black babies were born in hospitals with the highest mortality rates (Howell et al. 2008). Thus, white infants had access to better hospitals for their care. The hospitals that the Black infants had access to had lower quality of care. It was estimated that

mortality rates for Black infants would be reduced by 6.7 per 1000 for very low birth weight births, if the Black women gave birth in the same hospitals where the white women were giving birth (Howell et al. 2008). One study called the care for preterm infants "segregated and unequal" reporting that Black and Hispanic infants are more likely to receive care in lower-quality NICUs (Ravi, Iacob, & Profit 2021). Equal access to the same quality care that white infants receive would significantly decrease the disparity between Black and white mothers and infants.

In addition to the segregation and access to care that Black infants experience, there is an "ethnic variation in the quality of care" that babies receive within NICUs (Profit et al. 2017). The lack of quality care for Black infants is not only about the location but some studies suggest that there is unequal care among white and Black babies who are being treated in the same neonatal intensive care units (Profit et al 2017; Horbar et al. 2019). For babies who are low birth weight and very low birth weight, minority babies had lower markers on scores of quality care than white babies within the same NICU (Edwards et al. 2021). Additionally, a population study that was conducted in California showed that the quality of care received for Black babies with very low birth weights was substantially different than the quality of care received by white babies with very low birth weight (Ravi, Iacob, & Profit 2021). This literature shows that health inequality exists for the preterm infants, whether in segregated locales or in the same NICUs.

Regarding the health of preterm infants, studies have shown that Black infants had 2-to-4 times higher morbidity when compared to white infants (Janevic et al. 2018). An example of this is that for babies with bronchopulmonary dysplasia (BPD), the babies

whose parents identified as Black received higher tracheostomies than white babies. Tracheostomies are a surgical opening that is created in the trachea to assist in breathing; only the most severe cases of BPD need tracheostomies (Karkoutli, et al. 2022). Thus, the Black babies were sicker and needed the drastic intervention. The disparity among morbidities plays a factor, even with new technologies in health care. An example is that before artificial surfactant – an intervention that helps with breathing – was used to treat preterm babies with respiratory distress syndrome (RDS), Black infants had a small survival advantage over the white infants. This small survival advantage is possibly where the "Wimpy White Boy Syndrome" originated, reporting that white males did not breathe as well as Black females and males with RDS. Yet, after the introduction of the artificial surfactant, the advantage quickly became a disadvantage for Black preterm infants (Frisbie et al. 2004 & Howell et al. 2010). It is likely because people with the most advantages will have access to the new technologies and opportunities in the healthcare system (Phelan & Link 1995; Phelan & Link 2015). The limited research that does exist on this subject shows stark disparities in the morbidities and mortality of Black and white preterm infants, which could be because of quality of care, segregation, access, or unconscious bias of the providers.

Despite these well-documented findings, the belief in the "Wimpy White Boy Syndrome" persists. This belief likely has its origins in minimal empirical findings that demonstrate that racial disparities in health outcomes diminish among pre-term and low birthweight infants. Regardless of the empirical racial differences in health among the NICU babies, racialized medical thought and sociological concepts of intersectionality and fundamental cause may shed light on why the *belief* exists.

THEORETICAL FRAMEWORK

"Strong Black Women", Intersectionality, and Fundamental Cause

Intersectionality is the idea that different pieces of people's lives – such as race and gender – can expose people to discrimination and oppression (Collins 2016). Both the gender and the race of the infant are factors that influence the care that they receive in the NICUs. The intersection of race and gender is present in this study because the current norm within the neonatal intensive care units is the belief that racial differences in health are conditioned by gender, such that white boys will be the wimpiest and the Black girls will be the strongest. It is possible that the research will show disparities in both race and gender (Crenshaw 1991). Thus, exploring the intersection of both is incredibly important in furthering the research. If the belief that girls are stronger specifically, Black girls, then they could receive fewer resources and patient care than boys or specifically white boys.

The belief that white boys in the neonatal intensive care unit are wimpy, and the hierarchy of strength created by this belief places Black females at the top. Thus, there is a belief that the Black female infants must be the strongest and will have the best health outcomes. A part of this racially held belief is the concept called the "Strong Black Woman" (Collins 1991; Beauboeuf-Lafontant 2007). The "Strong Black Woman" is a sociological construct placed on Black females that they are and/or must be strong. The history of this belief is married to the thought that Black females have higher pain

tolerances since they are “less civilized”, even to the extent that Black female slaves underwent surgical procedures without anesthesia at the hand of a prominent Alabama gynecologist in the 1800s (Rich 2016; Ojanuga 1993). This has seemingly translated to modern medicine since doctors tend to underestimate the pain of Black patients (Staton et al. 2007). Specifically in maternal health, Black women receive less pain medicine in childbirth and post-partum care (Rich 2016; Badreldin, Grobman, & Yee 2019). Ultimately Black women experience “obstetric racism” because of a perception about their “obstetric hardiness” (Davis 2019). The ideas that have been pervasive throughout American history could still be present in the neonatal intensive care units. Through the eyes of the nurses and other medical staff, there could be a perception of the Black girl babies being strong with high pain tolerances. Thus, this intrinsic belief of the providers could cause the Black girls in the neonatal ICU to receive less attention and less care than the white boys.

Patient-Nurse Interaction, Implicit Bias, and Resource Allocation

Patient-nurse interaction will be explored as a possible explanation for the health disparities that may be discovered in the research. In the regular patient-nurse interaction, reciprocity and self-disclosure are a part of the patient and nurse interaction (Timmerman 1991). However, with a neonatal infant, there is not true reciprocity nor self-disclosure from the infant in the relationship. Yet, many of the nurses form strong bonds with the neonatal infants likely due to the long-term stays and high involvement with the infants’ care. The relationship between a neonatal infant and a neonatal nurse is unique. With neonatal infants, the parents are involved in the relationship with the nurse as well. As the

nurse becomes more attached to the infant, the nurse can either become more attached to the family or more distant from the family, based on the nurses' perception of the family's care of the infant. The relationship of the nurse and immediate family members could impact the care that a nurse provides to the infant. In addition, if a nurse believes certain theories, such as "Wimpy White Boy Syndrome", the nurse may provide more intensive and focused care to the white male infant and spend less time caring for the Black and/or female infants. Additionally, the focus and resources will be on the wimpy white boy, potentially causing a disparity in health care for the other infants. This special attention or diversion of resources can come from an implicit social bias or cognition that the provider has within themselves without even knowing (Greenwood and Banaji 1995). Unfortunately, some research has shown this implicit bias among the health care providers (Burgess et. al 2007, Stone & Moskowitz 2011, Shavers & Moskowitz 2012). Despite the mythos of this concept, if nurses have been taught that "wimpy white boys" are something that they need to give special attention to, then they may do that, based on both their implicit bias and their understanding of their practice responsibilities.

Other providers, such as physicians, can also be subject to the implicit bias and perpetuate the theory of "Wimpy White Boy Syndrome". Additionally, physicians are commonly the gatekeepers of the resources within the NICU and make the decisions about how those resources are allocated (Kluge 2007, Iserson 2020). In this case, if the provider's perception was that the white male baby was the most in need, then the resources could be distributed to the white male baby over another baby of another race. Rarely, resources can be re-allocated to the patient who may be more likely to benefit, such as having a greater chance of surviving (Iserson 2020). In those cases, the resources

could be re-allocated to the baby with the perception of "strongest", and in the case of this theory, it would be the female Black babies. However, in the case of resource scarcity, providers make the decision to conserve the resources and give priority to the "at-risk groups" as determined by their professional judgment (Iserson 2020). I examined discharge, mortality, and hospital charges to determine if disparities exist among babies in the NICU. Additionally, I explored if racial differences varied by gender.

METHODS

Data

Utilizing i2b2 electronic health record data from a Southern, regional, level IV NICU, I examine length of stay, mortality, and hospital charges by race and gender. Using data from a single, regional hospital system decreases the likelihood that the racial differences in outcome are due to segregation and access. The sample was taken from July 1, 2010 to September 15, 2022 of babies who are below 2,500 grams. The sample is 3,407 low birth weight (LBW) and very low birth weight (VLBW) Black and white infants in this NICU. Choosing to only sample LBW and VLBW babies was a control by design. All babies who are LBW or VLBW will automatically be in the NICU for some length of stay, based on their birth weight. LBW and especially VLBW babies are the "sickest" babies in the NICU. This increases the likelihood that I am observing a population-based sample of all LBW and VLBW births in the area. In this data, there were 6,706 possible observations. Of these, only 3,422 or 51% had gestational age recorded. Gestational age was not consistently recorded in the electronic health record until late 2016. Then, there was 1 missing on race, 1 missing on gender, 5 on death, and 13 missing on insurance status. Using listwise deletion to handle missingness leaves a sample size of 3,402 for the discharge and mortality analyses. An additional 124 are missing on hospital charges, leaving a sample size of 3,283 for that analysis.

Measures

Dependent Variables

Length of stay. This dependent variable is determined using the admit and discharge dates. Length of stay is measured in days. Majority of the babies were born inside the hospital and remained in the hospital until discharge. However, some of those babies are admitted to Children's Hospital and re-admitted to the regional NICU. These babies are in the hospital from their birth through their stay at Children's Hospital and through to their final discharge date from the regional NICU. Due to the collaboration with the regional NICU and the local Children's Hospital, the babies who transfer to Children's to receive a surgical intervention are usually transferred back to the regional NICU for the completion of their care. In the instance that they did not return to the NICU after discharging to Children's, they are right censored at the date of discharge to Children's (n=345). Additionally, some babies transfer in from outside hospitals, these cases came from a transfer hospital (n=293) with their first admittance date to be considered the first date they are admitted to this NICU. They will be included in the study, but they are left-censored, since their original admission date is unknown. Individuals are considered discharged once they are discharged home (=1). Infants who died (n=113), discharged to hospice (n=5), or transferred to another hospital (n=36) are considered to have not experienced this event (=0). The variable length of stay determines a baby's time until discharge for the analysis.

Mortality. Infants that die in the NICU are recorded on the electronic health record along with the date of their death. Among individuals who were discharged to hospice care (n=5), their date of death is recorded as their discharge date.

Hospital charges. In the electronic health records, hospital charge was the only measure of resources that could be evaluated. The hospital charge variable was made into a daily charge by dividing the total charge by length of stay. Then, the hospital charge variable was logged for analysis to handle the non-normal distribution.

Independent Variables

Race. The first independent variable for this sample is determined by the mother identifying the race of the baby on the birth certificate. Once the mother does this, it is entered into the electronic medical record. In this study, race is measured as white, Black, and other.

Gender. This independent variable is determined at birth based on the anatomical features of the baby. The variables were already identified within the data. Gender was re-coded into a dummy variable. Also, a four-category racial gender variable was created to look at the four groups – white males, white females, Black males, and Black females. The decision to utilize "gender" instead of "sex" is because I am interested in the social aspect of how babies are treated by providers. I also care about the biological vulnerability, social perceptions, and meaning regarding their gender.

Covariates

Gestational age. The gestational age variable was changed from gestational days at birth to gestational weeks at birth, as that is how it is measured and discussed in the neonatal intensive care units. It is being utilized as a variable to determine the health of the babies in the sample.

Respiratory distress. This variable is determined using the ICD-10 code P22: "Respiratory distress syndrome of a newborn". They are coded as having this condition if the diagnosis is reported on the medical record for the baby.

Sepsis. This variable is determined using the ICD-10 code P36: "Bacterial sepsis of a newborn". They are coded as having this condition if the diagnosis is reported on the medical record for the baby.

Maternal conditions. This variable is determined using the ICD-10 code P00: "Newborn affected by maternal conditions". They are coded as having this condition if the diagnosis is reported on the medical record for the baby.

Insurance status. Insurance status was originally labeled as financial class and was measured as Blue Cross, Champus/Tricare, Commerical, Indingent/Charity Care, Medicaid Pending Mdast, Medicaid, Medicaid Out of State, Medicaid Patient 1st, Medicare HMO/PPO/FFS, True Self Pay, United Health Care, Vet Admin, Viva Health, and Viva UAB. This was then re-coded into any private insurance (=1) and no private insurance including those that are uninsured (=0).

STATISTICAL ANALYSES

For the analysis process, descriptive statistics were assessed by looking at the means and frequencies. I used Cox Proportional Hazard Modeling, a type of survival analysis to examine the hazard to discharge to home or death. Cox Proportional Hazard Modeling is used when explaining the risk of event occurrence. It takes the ratio of hazards for any two individuals to determine whether individuals that differ by the independent variable have a different hazard than the general population. This model is an assumption that "every individual's hazard is a constant multiple of every other individual's hazard" (Allison 2010). Given the likelihood that the event occurred in the specific time period, it determines what the hazard is for individuals who are Black compared to white. The individual's hazard is a multiple of every other hazard. To analyze resource allocation using the hospital charge variable, Ordinary Least Squares regression model was used for this analysis. To examine where there are racial differences in the outcome, Model 1 includes race, gender, and insurance. Model 2 adds gestational age, sepsis, respiratory distress, and maternal health conditions and examines where racial differences in the outcome persist after accounting for infant health. However, sepsis is not included in the mortality model as it is too predictive of mortality. Lastly, Model 2 includes the interaction between race and gender and examines whether racial differences vary by gender.

RESULTS

Table 1

Table 1 (n=3,283) shows that the average length of stay for the sample was 50.61 days. In the sample, 41% of the babies are white, 47% of the babies are Black, and only 12% are other races. Overall, there is a slightly higher percentage of Black infants in the NICU, and it is likely because the sample consists of those low birth weight and very low birth weight infants. Approximately 51% of the sample is male with 49% being female. Seventy-nine percent have private insurance only, and 21% have other insurance or no insurance. The average gestational age is 31 weeks, and the average hospital charge is $6,973. 106 babies died representing less than 1% of the sample.

Table 1. Descriptive Statistics (n=3,283)

	Mean or %
Length of Stay	50.61
	(0.88)
Race	
White	40.9
	(0.008)
Black	46.8
	(0.008)
Other	12.2
	(0.005)
Gender	
Male	50.9
	(0.008)
Female	49.1
	(0.008)
Insurance	
Private	78.7
	(0.007)
Public	21.3
	(0.007)
Gestational Age	31.003
	(0.059)
Respiratory Distress	68.5
	(0.008)
Sepsis	6.3
	(0.004)
Maternal Conditions	2.5
	(0.003)
Hospital Charges	6973.829
	(159.04)
Death	0.05
	(0.001)

Standard errors are in parenthesis under the means.

Table 2

Table 2 (n=3,407) presents the hazard ratio from Cox Proportional Hazard modeling for length of stay. Model 1 demonstrates that Black babies do have lower hazard for discharge, net of gender and insurance. Compared to white babies, Black babies had 0.842 the hazard of discharge to home ($p<0.001$). Thus, Black babies are more likely to have longer stays in the NICU. Model 2 adds gestational age and health conditions and finds that these factors account for racial differences in time until discharge. Concerning gestational age, I find for every one week increase in gestational age, the hazard of discharge increases by 1.31 ($p<0.001$). Additionally, having a diagnosis of respiratory distress or sepsis is associated with a lower hazard of discharge to home (HR: 0.862, $p<0.01$ for respiratory distress; HR: 0.672, $p<0.001$ for sepsis). Model 3 adds the interaction between race and gender. The interaction is significant ($p<0.05$), which demonstrates that racial differences in the hazard of discharge to home varies by gender. The racial differences are significant for boys, but they are not significant for girls. Among boys, I find that the Black and other babies are more likely to be discharged to home compared to white boys (HR for Black babies: 1.155 and HR for other: 1.247). However, I find that Black and other race girls have similar hazards of discharge to home compared to white girls (HR: 981; $p=0.728$ for Black babies and HR: .932; $p=0.25$ for other babies). The analyses among girls were not shown here. Lastly, among all white babies, I find girls are more likely to be discharged to home than white boys (HR: 1.123, $p<0.05$).

Table 2. Cox Proportional Hazard predicting discharge for LBW and VLBW babies (n=3,402)

	Model 1		Model 2		Model 3	
	haz ratio	p	haz ratio	p	haz. ratio	p
Race						
(white)						
black	0.842	0.000***	1.064	0.132	1.155	.012*
other	1.019	0.754	1.082	0.191	1.247	.008**
Gender						
(male)						
female	1.005	0.891	1.004	0.903	1.123	.044*
Insurance	0.931	0.136	0.889	0.014	0.89	0.015*
Gestational Age			1.308	0.000***	1.31	0.000***
Respiratory Distress			0.862	0.001***	0.86	0.000***
Sepsis			0.672	0.000***	0.671	0.000***
Maternal Conditions			0.932	0.549	0.931	0.547
Race#Gender						
black#female					0.848	.039*
other#female					0.748	.016*
Chi2	0.0003***		0.000***		0.000***	

Significance for the hazard ratio: *p<.05, **p<.01, ***p<.001

Table 3

Table 3 (n=3,407) displays the hazard ratio from the Cox Proportional Hazard Modeling for mortality. Model 1 looks at the hazard of morality for Black and other babies compared to white babies, net of insurance and gender. Compared to white babies, Black babies had 1.576 the hazard of mortality, but it was not significant (p=0.061). Model 2 includes the health measures of gestational age, respiratory distress, and maternal conditions as covariates. Higher gestational age is significantly associated with mortality (HR: 0.784, p<0.001). There are no significant racial differences in mortality in

this model. Model 3 adds the interaction between race and gender. Racial differences do not vary by gender, as the interactions were not significant.

Table 3. Cox Proportional Hazard predicting mortality for LBW and VLBW babies (n=3,402)

	Model 1		Model 2		Model 3	
	hazard ratio	p	hazard ratio	p	hazard ratio	p
Race						
(white)						
black	1.564	0.065	1.13	0.62	1.36	0.733
other	1.654	0.139	1.344	0.389	1.571	0.114
Gender						
(male)						
female	0.902	0.606	0.827	0.345	1.073	0.617
Insurance	1.502	0.1	1.468	0.12	1.455	0.131
Gestational Age			0.784	0.000***	0.785	0.000***
Respiratory Distress			0.757	0.260	0.755	0.035*
Maternal Conditions			0.388	0.347	0.388	0.498
Race#Gender						
black#female					0.677	0.392
other#female					0.715	0.624
Chi2	0.365		0.000***		0.000***	

Significance for the hazard ratio: *p<.05, **p<.01, ***p<.001

Table 4

Table 4 (n=3,283) presents Ordinary Least Squares Regression that predicts the hospital charges for the babies in the sample. Model 1 looks at the racial differences in daily hospital charge, net of insurance and gender. Model 1 finds that Black babies have 2.5% ($p<0.05$) higher hospital charges than white babies, net of gender and insurance. Additionally, those with private insurance have 3.2% higher hospital charges compared to those without private insurance ($p<0.05$). There are no significant gender differences. Model 2 includes gestational age, respiratory distress, sepsis, and maternal conditions as covariates to determine if racial differences are accounted for by health. Similar to the discharge results, once controlling for health, Black babies no longer have significant differences in their hospital charges compared to white babies. Higher gestational age and having a diagnosis of maternal health conditions are associated with lower hospital charges ($b=-0.034$, $p<0.001$ for gestational age; $b=-0.136$, $p<0.001$ for maternal health conditions). However, having the diagnosis of sepsis is associated with a 7.5% increase in hospital charges ($p<0.001$). In Model 3, the interaction is not significant, demonstrating that racial differences do not vary by gender.

Table 4. OLS Regression predicting daily hospital charges for LBW and VLBW babies, (n=3,283)

	Model 1		Model 2		Model 3	
	b	p	b	p	b	p
Intercept	8.77	0.000*	9.873	0.000***	9.873	0.000***
Race (white)						
black	0.025	0.023*	-0.007	0.483	-0.004	0.748
other	0.0115	0.489	-0.012	0.419	-0.007	0.735
Gender (male)						
female	-0.011	0.253	-0.016	0.078	-0.014	0.297
Insurance	0.032	0.012*	0.022	0.054	0.022	0.055
Gestational Age			-0.034	0.000***	-0.034	0.000***
Respiratory Distress			-0.012	0.246	-0.012	0.245
Sepsis			0.075	0.000***	0.075	0.000***
Maternal Conditions			-0.136	0.000***	-0.136	0.000***
Race#Gender						
black#female					-0.005	0.776
other#female					-0.011	0.705
R2	0.0031**		0.172		0.172	
Model F	0.0381*		0.000***		0.000***	
Significance for OLS: *p<.05, **p<.01, ***p<.001						

DISCUSSION

Discharge was assessed to determine the health outcome of the babies. If babies are more likely to discharge, then it is likely that they are healthier. If they are less likely to discharge, then they are sicker. I expected to find that there was an intersection of racial and gender differences in discharge between Black and white babies, specifically with Black babies being less likely to discharge. I do find that Black babies are less likely to be discharged from the NICU compared to white babies. However, gestational age, respiratory distress, sepsis, and maternal conditions accounted for racial differences in the hazard for discharge among babies in the NICU. This suggests that while Black babies are less likely to discharge than white babies, it is because they have younger gestational ages and possibly worse health. However, this varied by gender. Among boys, accounting for health resulted in Black male babies having a higher hazard of discharge to home compared to white male babies. Among girls, there were no racial differences in time until discharge. Two explanations could exist for this finding: 1. Black male babies do have worse health than white babies, but within poorer health status, Black male babies are heartier than white male babies or 2. Black boys could be determined as healthier by providers due to the underlying belief of the "Wimpy White Boy Syndrome" and thus, they are discharged quicker. The first explanation is supported by other research that discovered survival differences at lower gestational ages. Morse and colleagues (2006) found that Black female babies have a higher survival rate than white males if they have

extremely low gestational ages. However, the findings in my research suggests the second explanation due to the suggestive findings regarding mortality and the hazard of discharge changing when accounting for health. However, more extensive research needs to be conducted to determine the actual existence and impact of this ongoing belief in the NICU.

The finding for racial differences in discharge could be due to factors related to the family and not the provider, as there could be some cultural differences in the trust of providers (Benkert et al. 2006). For example, a parent of a Black infant could not trust the provider, based on perceived discriminatory events or their past experience in health care settings. Thus, those families could push for quicker discharges. However, this is likely not the case, as it is unlikely that these cultural differences would vary by the gender of the child. However, the belief in WWBS is gender-specific much like the race and discharge finding presented here. Additionally, the likelihood that it is due to WWBS and not actual differences in health is bolstered by the findings for mortality because if WWBS is true, I would have found that white boys have higher mortality. However, I found that there are suggestive differences by race such that Black babies have a higher mortality hazard than white babies even though these differences fail to reach significance and are fully accounted for by gestational age and health (HR: 1.576; p=0.061 for Black babies from Table 3, Model 1). The rarity of the outcome (death) likely impacted the likelihood of finding significance. Only 1% of the sample died, making it a relatively rare event. 32 white babies, 61 Black babies, and 13 other babies are recorded as deceased or discharged to hospice.

Resource allocation was assessed through looking at daily hospital charges. Hospital charges help determine the number of resources that may be allocated to specific babies, and this may differ based on race and/or gender. Similar to my discharge findings, I did find a significant relationship between hospital charges and Black babies. Black babies had 2.5% higher hospital charges than white babies. However, racial differences are not significant after accounting for health (from Model 1 and 2 in Table 4). Hospital charges represent the amount each child was charged for the interventions and services used on the child. The charges are not necessarily reflective of care, but it is used here to determine resources possibly utilized for each patient. However, the charges also could reflect the longer stays, as a baby will have higher charges for longer lengths of stay, as the babies are sicker and require more interventions. The hospital charges can reflect how the resources are allocated by the providers, who are the gatekeepers of those resources (Iserson 2020; Kluge 2007). However, while hospital charges are indicative of the dollar amount of medical intervention received, they do not shed light on the amount of care work done by nursing staff, including time spent comforting and consoling families and time spent tending to the child's needs (Timmerman 1991). Future research should either examine this using qualitative methods of ethnography or a resource diary. Additionally, resource allocation could be examined by determining which babies are discharged during high volume months in the NICU, which would be when resources are scarce.

LIMITATIONS

While this is the first study to empirically examine "Wimpy White Boy Syndrome" using a racially diverse sample of all low birthweight infants, some limitations do exist in this study. Unfortunately, EHR data does not consistently collect information on patient-level socioeconomic status. This research only used insurance status as a socioeconomic status measure. While insurance status is correlated with other markers of socioeconomic status, it is an imperfect measure of socioeconomic status. The research could be furthered by using the area deprivation index with the census track data to determine socioeconomic status as addresses are available on EHR. The dataset only applies to individuals who received care at this hospital. However, this hospital has a high proportion of Black residents around 30% unlike the 14% in the United States. This provides a large enough sample size to reflect an accurate estimate of Black/white disparities. Additionally, this is a regional, level IV NICU increasing the likelihood that our sample comes from a more geographically diverse area than the immediate city. It would be fruitful to see if these patterns are similar in other regions to determine if this belief is held across various sites nationally. Fifty-sex percent of Black Americans live in the Southeast and outside the Southeast, most Black Americans live in urban areas (Pew Research Center 2021). These demographic differences likely impact cultural variation in beliefs concerning child health, as well as variations in structural factors that lead to variation in racial differences in health (Baickar et al. 2005). Thus, it would be important

to determine if this theory is pervasive across the nation. If the belief is within NICUs across the nations and continues to be contradictory to the research, it would be imperative to address these biases.

CONCLUSION

The findings of this study are interesting and nuanced, as my results suggest that the belief in "Wimpy White Boy Syndrome" is real, but the reality of it is not. Black babies are less likely to get discharged because they have lower gestational ages. However, once health (gestational age) is accounted, Black babies are no longer less likely to be discharged. Yet, this racial difference is only found among boys, not girls, and within whites, girls are more likely to be discharged than boys. My findings suggest that the belief in "Wimpy White Boy Syndrome" is perhaps a self-fulfilling prophecy. The providers perceive that Black babies are healthier and thus, they are discharged quicker. Thus, my findings support the theory of discrimination as a fundamental cause of health disparities (Phelan and Link 2015). However, this discrimination is not necessarily explicit, as it likely displays an implicit social bias of the providers and their provider-patient interaction (Greenwood and Banaji 1995; Timmerman 1991). If white boys are wimpier, then they should have been less likely to be discharged and health should have accounted for those differences.

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