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A First Look into Racial/Ethnic Differences in Obstetric Outcomes at LVHN: Postpartum Hemorrhage Rates and Care

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Background

Postpartum hemorrhage (PPH) is the leading cause of maternal deaths in both developed and underdeveloped countries (1). Hemorrhage accounts for 27% of maternal deaths worldwide and are followed by other causes like hypertensive disorders, sepsis, abortion, and embolism (1). A national United States inpatient analysis showed a rate of 3% in 2012-2013 for postpartum hemorrhage (2,3). Overall, patients with postpartum hemorrhage were shown to have a significantly higher average length of stay as well as higher inpatient mortality rates (2,3).

Racial and ethnic disparities in healthcare occurs when particular groups of patients have differences in their health outcomes when other variables like health insurance and the same access to a doctor are controlled. Racial disparities in obstetric care has been well studied (4-7). Regarding postpartum hemorrhage, it has been reported in a study of 25 United States hospitals that non-Hispanic White women were significantly less likely to have severe postpartum hemorrhage while Asians and Hispanics had the highest rates (8). Although rates of PPH with respect to race has been documented, what has been less well documented is the severity of the postpartum hemorrhage and the different medical managements such as transfusions or number of uterotonics required. Rates of postpartum hemorrhage among Cesarean compared with vaginal deliveries based on the variable of race has also not been published.

Problem Statement

This is the first investigation into racial disparities in obstetric outcomes at LVHN and will evaluate postpartum blood loss as well postpartum hemorrhage rates and management.

Methods

This was a retrospective chart review that is a component of the approved larger IRB project titled: *For women after vaginal and cesarean deliveries, does quantitative blood loss when compared to estimated blood loss have better predictability of calculated blood loss?* This study included patients <18 y.o. with gestational ages between 24w0d – 41w6d who delivered at LVHN. It included both vaginal and Cesarean deliveries. The estimated number of records reviewed was 4,500 with approximately 3,300 included in the analysis. The data was extracted with the EPIC electronic medical record. The data was collected for the time period of 9/2016 to 2/2018. The software SPSS was used to complete the statistical analysis.

Estimated blood loss (EBL) is the traditional way of recording blood loss and is based on visual examination of collection canisters and blood-soaked materials. Recent studies have shown that at larger objective volumes of blood, EBL underestimates blood loss (8). Quantitative blood loss (QBL) is collected through direct measurement with calibrated drapes and suction canisters that have volumes demarcated. The calculation for QBL includes subtracting amniotic fluid, weighing blood-soaked products, subtracting irrigation from the suction canisters, and more. The EBL data group is taken from patients delivering between September 2016 – February 2017. The QBL data group is taken from patients delivering between September 2017 – February 2018. This is due to system-wide changes about how blood loss was measured at LVHN.

Results

Table 1. Demographics at LVHN for Vaginal and Cesarean Deliveries Compared to the Nationwide Inpatient Sample

Race	Nationally*	LVHN Vaginal Deliveries (n = 2161)	LVHN Cesareans (n = 1100)
White	55%	70%	68%
Black	13%	7%	5%
Hispanic	27%	17%	21%
Asian	5%	3%	3%
Other	N/A	3%	3%

* Nationwide Inpatient Sample 2005 - 2008

Table 2. LVHN Vaginal Delivery Blood Loss and Postpartum Hemorrhage separated by estimated blood loss and quantitative blood loss

EBL-Vaginal data						
	White	Black	Asian	Hispanic	Other	P-value
Blood loss	300 (200-300)	300 (227.5-300)	300 (250-350)	300 (200-300)	300 (200-300)	.310
Postpartum hemorrhage	6 (0.8%)	1 (1.4%)	1 (2.6%)	1 (0.6%)	0 (0.0%)	.681

QBL-Vaginal data						
	White	Black	Asian	Hispanic	Other	P-value
Blood loss	168 (95-319)	122 (59.25-285)	190.5 (106.75-409.5)	140.5 (62-291.75)	107 (55-238)	.001
Postpartum hemorrhage	17 (2.3%)	2 (2.7%)	2 (5.9%)	0 (0.0%)	1 (3.2%)	.123

Table 3. LVHN Cesarean Delivery Blood Loss and Postpartum Hemorrhage separated by estimated blood loss and quantitative blood loss

EBL - Cesareans						
	White	Black	Asian	Hispanic	Other	P-value
Blood loss	681	653	642	726	709	.234
Postpartum hemorrhage	23 (4%)	1 (0.2%)	0 (0%)	12 (2%)	2 (0.4%)	.210

QBL - Cesareans						
	White	Black	Asian	Hispanic	Other	P-value
Blood loss	747	707	629	771	1003	.135
Postpartum hemorrhage	85 (15%)	6 (1%)	4 (1%)	41 (5.0%)	7 (1%)	.118

Table 4. PPH at LVHN (vaginal and Cesareans combined) vs national/state rates

Race	White	Black	Asian	Hispanic	Other
LVHN	5.8% (n=2245)	4.9% (n=204)	6.8% (n=103)	8.8% (n=614)	10.5% (n=95)
Nationally	2.2%	2.0%	2.6%	1.9%	

N = 1,030,350
From National Inpatient Sample years 1998 - 1999

Key takeaways:

- Notably, LVHN has a significantly higher proportion of White women at about 69% when compared to the national average of 55% and a lower proportion of all other races. (Table 1)
- We found that when examining differences in **quantitative blood loss (QBL)** in vaginal deliveries, there was a significant difference between the races with a p-value of .001. Asian women were found to have the highest volumes of blood loss with an average of 190 mL. (Table 2)
- We found no significant difference in blood loss or postpartum hemorrhage when comparing races for Cesarean births for both estimated blood loss and quantitative blood loss. (Table 3)
- LVHN has higher levels of postpartum hemorrhage in all races compared to national data. (Table 4)

Discussion

We were able to study race and ethnicity in regard to obstetric outcomes at Lehigh Valley Health Network. We found that the patient population has a larger White representation compared to the national racial breakdown. Our one significant finding was that there were differences in quantitative blood loss in vaginal deliveries between the races, with Asian women having the highest volumes of blood loss. However, we did not find that Asian women at LVHN had higher rates of postpartum hemorrhage. Overall, we were unable to reproduce the current literature which shows that Hispanic and Asian women had the highest rates of postpartum hemorrhage. This could be due to the way our hospital network measures blood loss, with the recent transition from using estimated blood loss (EBL) to quantitative blood loss (QBL). This finding could also be due to LVHN having clinical practice guidelines in place like prophylactic oxytocin that reduced racial discrepancies in obstetric care. Lastly, our sample size may have been inadequate to reveal these differences.

We also found that LVHN had higher rates of postpartum hemorrhage across all races than the national rates. After further evaluation, we found that the incidence of postpartum hemorrhages showed a notable increase when LVHN switched from measuring blood loss with estimated blood loss (EBL) to quantitative blood loss (QBL) for both vaginal and Cesarean deliveries. Therefore, it is unclear if we were underestimating PPH numbers prior to the implementation of QBL or whether inaccuracy stems from the imperfect method to calculate QBL (e.g. subtracting amniotic fluid, irrigation). It is also possible that we are under medicating for postpartum hemorrhage. Further studies are required to evaluate the source of the high rates of postpartum hemorrhage at LVHN and these studies can be used to inform quality improvement projects to improve equality in patient outcomes. Limitations of this study included errors due to race/ethnicity classification, confounding variables resulting from the use of EBL and QBL, and a limited sample size.

Conclusions

Overall, we were not able to show that there were meaningful differences in postpartum hemorrhage between different racial groups at Lehigh Valley Health Network. This is contrary to the well documented literature which shows that certain racial groups like Hispanic and Asian women have higher rates of postpartum hemorrhage. We did find that we have higher rates of postpartum hemorrhage across the board compared to the national rates.

Relating to the SELECT domain of health systems, this project touches on topics like improving patient outcomes and analyzing possible systemic biases within the healthcare system. The results of this project did not reveal racial differences in postpartum hemorrhage but did reveal that we have high rates of PPH. As a result, we could further study what the root cause may be. Understanding which subsets of patients are affected postpartum hemorrhage effects and how to effectively implement interventions can have significant effects on patient outcomes, patient safety, healthcare quality, as well as healthcare costs given that patients with postpartum hemorrhage are shown to have longer inpatient stays as well as higher inpatient mortality rates. Overall, this project can contribute to an overall systemic improvement of obstetric care at LVHN by advising possible future quality improvement projects to improve patient outcomes and patient safety.

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