Neonatal Health Outcomes Following Water Immersion During Labor and Delivery

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Introduction

- The goal of this study is to compare the neonatal outcomes after water birth delivery to standard delivery.
- From April 2015 to December 2019, there were 2077 total deliveries separated into three groups based on their location for labor and delivery: 458 land/land deliveries, 730 water/land deliveries, and 889 water/water

Methods

Study Design

Prospective observational study with three groups:

- Land labor and land delivery (land/land),
- Water labor and land delivery (water/land),
- Water labor and water delivery (water/water).

Population

- Preselected, low risk
- In hospital alternative birthing center accredited by Commission for the Accreditation of Birth Centers (CABC)
- Immediate access to emergency obstetrical and neonatal care

Data Collection

Data were collected following the approved IRB-06272 protocol by:

- Observation
- Questionnaires
- Phone Calls

Data analysis

- Quantitative data were analyzed using analysis of variance of continuous variables (ANOVA) in Microsoft Excel.
- Qualitative data were analyzed using Chi-square t-tests.
- A binary logistic regression was created using Statistical Package for the Social Sciences (SPSS).
- Alpha = 0.05 was accepted as the significance level.

Maternal Demographics

Maternal demographics that were characterized for the three groups were age, race, BMI > 30, education length, history of prior preterm birth, nulliparous status. alcohol use, tobacco use, IV drug use, and gestational age at delivery. Only nulliparous status was found to be statistically and clinically different between the three groups:

- Nulliparous status (p<0.001)
  - Land/land – 27% (n=125)
  - Water/land – 45% (n=330)
  - Water/water – 24% (n=211)

Neonatal Outcomes

Table 1. The location of labor and delivery did not significantly impact delivery outcomes.

Outcome	Land/ Land (n = 458)	Water/ Land (n = 730)	Water/ Water (n = 889)	p
Birth Weight (grams)	3610 ± 486	3597 ± 445	3559 ± 431	0.10
APGAR < 7 at 5 min	4 (0.9%)	4 (0.5%)	3 (0.3%)	0.44
Need for resuscitation	3 (0.7%)	5 (0.7%)	9 (1.0%)	0.70
NICU Admissions (n,%)	13 (2.8%)	30 (4.1%)	18 (2.0%)	0.07
Neonatal Mortality	0	1(0.1%)	0	0.40

Observed neonatal outcomes after delivery were not significantly different after delivery. There was one neonatal death in the water/land group to a woman who had intended to delivery in water and experienced an umbilical cord prolapse after spontaneous rupture of membranes.

NICU Admissions

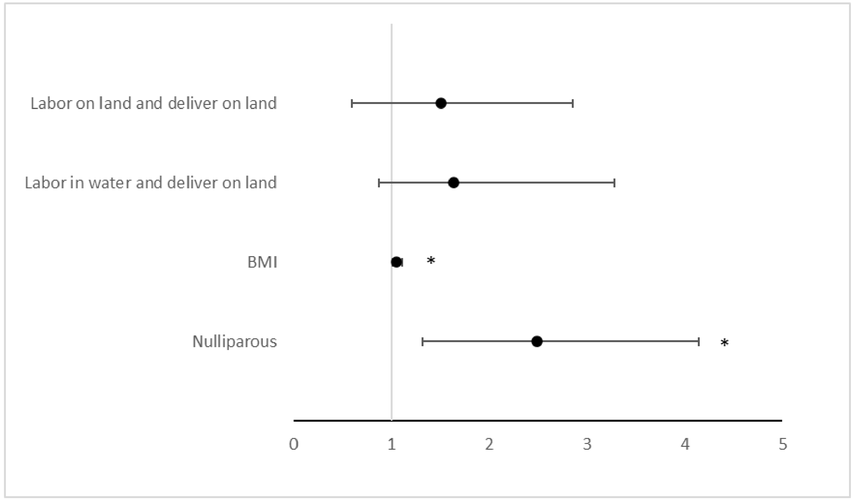
Table 2. The location of labor and delivery did not significantly impact the cause of NICU admissions.

Morbidity Category	Land/Land (n=13)	Water/Land (n=30)	Water/ Water (n=18)	p
Congenital/ Acquired	7 (54%)	11 (37%)	9 (50%)	0.64
Infectious	5 (38%)	13 (43%)	5(28%)	
Respiratory	1 (8%)	6 (20%)	4(22%)	

NICU admissions were categorized into one of three groups: congenital/acquired, infectious morbidity, and respiratory morbidity. The congenital/ acquired NICU admissions consisted of anomalies, seizures, hyperglycemia, hyperbilirubemia, and respiratory depression. Infectious morbidity consisted of rule out sepsis, clinical or culture proven sepsis, and inadequate prophylaxis for maternal group B streptococcus. Respiratory morbidity consisted of neonatal respiratory distress syndrome, meconium aspiration syndrome, tachypnea, and apnea.

Risk Ratios

Figure 1. Maternal BMI and nulliparous status significantly increased risk for NICU admission.



A binary logistic regression was created to predict the odds that the chance of NICU admission was based on location of labor and delivery. All maternal demographic data were included in the regressionThe binary logistic regression found that laboring on land and delivering on land did not impact the odds of NICU admission compared to laboring and delivering in water (p=0.505). Laboring in water and delivering on land also did not impact the odds of NICU admission compared to laboring and delivering in water (p=0.122). However, other maternal characteristics were found to increase odds of NICU admissions. Nulliparous status had the greatest impact on increasing the odds of NICU admissions with an odds ratio of 2.342 with a 95% confidence interval of 1.324 to 4.143 (p=0.003). Increasing BMI had the next greatest impact on the odds of NICU admissions with an odds ratio of 1.062 and confidence interval of 1.013 to 1.113 (p=0.013).

Conclusion

The results of this study suggest that water birth does not increase adverse neonatal outcomes, including infectious or respiratory causes, when compared to delivery on land, in our population.

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