

Limited English Proficiency and Post-operative Outcomes after Cesarean Delivery

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Background

- Over 60 million people speak a non-English language at home and 25 million speak English less than “very well”¹
- Spanish-speaking patients are less likely to anticipate using neuraxial analgesia when asked about which method of pain control they plan to use during labor and are less likely to have an epidural placed during labor²
- Language-concordant educational program on labor epidurals increased its use among Hispanic patients³
- Non-English speakers had significantly higher rates of cesarean section (CS) compared to English speakers⁴
 - Hispanic and non-Hispanic black individuals underwent CS more frequently than white counterparts⁵
- Multiple CS associated with increased risk of uterine rupture, abnormal placentation, ectopic pregnancy, stillbirth, preterm birth⁶

Objective

- To evaluate the association between limited English proficiency (LEP) and post-operative length of stay (poLOS), total length of stay (tLOS), and total hospitalization costs after cesarean delivery

Methods

- Retrospective cohort study of patients who underwent cesarean section between 2015-2019 at a single academic medical center
- Limited English proficiency defined as patients’ indication of a non-English primary language and preference for interpreter services at time of admission
- Multivariable analyses adjusted for age, race/ ethnicity, and primary insurance type

Baseline Characteristics

Table 1: Characteristics of patients undergoing cesarean section, by English proficiency				
	Total sample N=3,962	English Proficient N=3,739	Limited English Proficiency N=223	
	N (%)	N (%)	N (%)	P value
Patient Characteristics				
Age, mean (SD), years	34.3 (5.3)	34.4 (5.3)	32.6 (5.1)	<0.001 ^a
Race/Ethnicity				<0.001 ^b
White	1,681 (42.4%)	1,672 (44.7%)	9 (4.0%)	
Asian/Pacific Islander	913 (23.0%)	848 (22.7%)	65 (29.1%)	
Hispanic/Latinx ^e	623 (15.7%)	500 (13.4%)	123 (55.2%)	
Black	260 (6.6%)	259 (6.9%)	1 (0.4%)	
Indigenous	17 (0.4%)	17 (0.5%)	0 (0.0%)	
Other ^f	468 (11.8%)	443 (11.8%)	25 (11.2%)	
Language Spoken				<0.001 ^b
English	3,739 (94.4%)	3,739 (100.0%)	0 (0.0%)	
Spanish	129 (3.3%)	0 (0.0%)	129 (57.8%)	
Chinese (multiple languages)	33 (0.8%)	0 (0.0%)	33 (14.8%)	
Other Non-English	61 (1.5%)	0 (0.0%)	61 (27.4%)	
Primary Insurance Type				<0.001 ^b
Private	2,929 (73.9%)	2,882 (77.1%)	47 (21.1%)	
Public	1,003 (25.3%)	827 (22.1%)	176 (78.9%)	
Medicare	30 (0.8%)	30 (0.8%)	0 (0.0%)	
ASA Rating				0.09 ^c
ASA 1	132 (4.5%)	123 (4.4%)	9 (5.3%)	
ASA 2	2,300 (78.4%)	2,179 (78.8%)	121 (71.2%)	
ASA 3	478 (16.3%)	441 (15.9%)	37 (21.8%)	
ASA 4	24 (0.8%)	21 (0.8%)	3 (1.8%)	
ASA 5	1 (0.0%)	1 (0.0%)	0 (0.0%)	
BMI, mean (SD), kg/m ²	30.4 (6.4)	30.4 (6.4)	29.9 (6.1)	0.3 ^a
Case Characteristics				
Case Length, mean (SD), min	82.9 (266.8)	82.5 (273.3)	89.0 (113.5)	0.72 ^a
Estimated Blood Loss, mean (SD), mL	653.0 (856.3)	655.4 (870.1)	613.0 (578.0)	0.47 ^a
Outcomes				
Length of Stay, median (IQR), days	4.0 (4.0-6.0)	4.0 (4.0-6.0)	5.0 (4.0-7.0)	0.002 ^d
Direct Costs, median (IQR), \$	15462.1 (12640.4-19081.2)	15434.2 (12611.7-18979.7)	16134.4 (13248.2-22708.6)	0.004 ^d

Data are presented as mean (SD) or median (IQR) for continuous measures, and n (%) for categorical measures. ^aTwo sample t test. ^bPearson’s chi-squared. ^cFisher’s exact. ^dWilcoxon rank-sum. ^eHispanic/Latino category includes anyone who self-identified as Hispanic or Latino ethnicity regardless of race. ^fOther category includes patients with unknown or unspecified race or ethnicity. Abbreviations: ASA, American Society of Anesthesiologists; BMI, body mass index; SD, standard deviation.

Association of LEP with LOS and Cost of Hospitalization

Table 2: Unadjusted and adjusted effect of limited English proficiency on postoperative outcomes for patients undergoing cesarean delivery												
	Post-operative length of stay				Total length of stay				Cost of hospitalization/ direct costs			
	IRR*	P> z	[95% Conf. Interval]		IRR*	P> z	[95% Conf. Interval]		IRR*	P> z	[95% Conf. Interval]	
Bivariate Model												
English Proficient (Reference)	1				1				1			
Limited English Proficiency	1.08	0.035	1.01	1.15	1.25	<0.001	1.15	1.36	1.24	<0.001	1.15	1.33
Multivariable Model												
Language Proficiency												
English Proficient (Reference)	1				1				1			
Limited English Proficiency	1.04	0.34	0.96	1.12	1.14	0.007	1.04	1.24	1.11	0.007	1.03	1.2
Age, years												
	1	0.41	1	1	1	0.22	0.99	1	1	0.63	1	1
Race/Ethnicity												
White (Reference)	1				1				1			
Asian/Pacific Islander	1	0.83	0.96	1.05	0.98	0.43	0.93	1.03	1	0.82	0.96	1.05
Hispanic/Latinx	1.02	0.45	0.97	1.07	1.05	0.13	0.99	1.12	1.07	0.014	1.01	1.12
Black	1.08	0.04	1	1.15	1.18	<0.001	1.08	1.28	1.17	<0.001	1.09	1.25
Indigenous	1.06	0.63	0.83	1.35	0.96	0.79	0.7	1.31	0.96	0.77	0.75	1.23
Other/Unknown	1.03	0.34	0.97	1.08	1.06	0.07	1	1.14	1.03	0.26	0.98	1.09
Primary Insurance Type												
Private (Reference)	1				1				1			
Public	1.07	0.002	1.02	1.12	1.17	<0.001	1.11	1.24	1.18	<0.001	1.13	1.23
Medicare	1.26	0.006	1.07	1.49	1.63	<0.001	1.31	2.02	1.39	0.001	1.16	1.68
Model Constant	3.5	<0.001	3.12	3.94	5.78	<0.001	5	6.69	18,074	<0.001	16,097	20,294
*Negative binomial regression models accommodated right skew exhibited by post-operative length of stay, total length of stay, and total cost; the resulting incidence rate ratio are given. Abbreviations: IRR, incidence rate ratio; CI, confidence interval.												

Conclusions

- Patients with LEP may experience delays to CS contributing to increased total length of stay and hospitalization costs
- Mechanisms driving these disparities remain unclear and language may be a marker for social or cultural preferences or health literacy
- Limitations include single-center study design and inability to quantify impact of professional or ad hoc interpreters and language-concordant providers

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